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ABSTRACT

Eight papers which discuss rational and nonrational modes of knowing and consciousness and their relevance to educational practice are presented. Richard Jones in "Looking Back and Forth on Consciousness" considers two modes, the rational and the metaphoric, in a discussion of dreams. Alfred Kuhn discusses random variation and selective retention (RVSR) as operations of left and right brain. The combination of the two produce rationality. Maxine Greene focuses on imaginative literature as expressing an array of modes of consciousness. Arthur Wellesly Foshay in "Intuition and Curriculum" pleads for the legitimacy of intuition and offers several examples of how the intuitive leap may be encouraged in school. Ronald Lippit and Eva Schindler-Rainman in "Knowing, Feeling, Doing" call for a fully linked person. The three elements in the title are necessary for the education of the whole person. Robert Samples makes a sharp distinction between right and left hemisphere activities and explains the dominance of the linear, logical, rationalist mode of thinking in schools chiefly through the lack of trust engendered in the classrooms. Mark Phillips describes confluent education, which recognizes and employs all forces present in classroom activity at a given time. John Haas discusses the term synectics, which refers to the unity of the metaphoric and the analytic in the creative process, and uses examples drawn from actual experience. The implications of all the papers are that there are many modes of knowing of which the rational is one and if we are to function fully we ought to make full use of all modes. (Author/KC)

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BEYOND THE SCIENTIFIC: A COMPREHENSIVE VIEW OF CONSCIOUSNESS

Edited by

Arthur Wellesley Foshay
and
Irving Morrissett

SO 012 025

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INTRODUCTION

During the past few years, a discussion has begun on the ways of knowing that go beyond the rational. For some people, the discussion began with Jerome Bruner's *On Knowing: Essays for the Left Hand* (1962), a brief book which declares the possibility that an important part of our thinking processes is being overlooked, or receiving little attention. The part that is being overlooked has many names; of the many names, more later. In general, it is that part that complements the rational.

We live in a time that is dominated by the rational-intellectual-scientific way of experiencing. While we are aware of impulse, of passion, of the "affective," we don't trust them. Like Samuel Johnson in his Dictionary, we define passion, not as a state of existence with its own meanings and properties, but as he did, "a disturbance of the reason."

Some of us have known better than this for a long time, and our tradition of culture has known better even longer. Alongside the tradition of science and of reason, there has always been a tradition of instantly sensed truth. The mystics, the prophets, the poets, many painters and sculptors, some dramatists, and the dancers and musicians have trafficked in this kind of truth since the beginning of civilization. Along with some philosophers, they have been honored and remembered, but they have become more and more of a mystery to us in modern times. This is surprising, for it is during our time that the function of the emotional in life has been studied systematically for the first time, and cadres of people exist who make a profession of untangling its effects. As Crane Brinton points out in *The Shaping of Modern Thought* (1963, ch. 7), the "anti-intellectual" has been thriving during the nineteenth and twentieth centuries. Side by side with the impressive discoveries in science have been Rousseau's "general will," Cardinal Newman's "illitive sense," the discovery of conditioning by Pavlov and others, and the discoveries of Freud—all real aspects of human experience and reflection, and none rational in the ordinary sense.

During the sixties and seventies of this century, renewed attention has been given to this aspect of human experience. It has been recognized once more that major intellectual accomplishments are in part non-rational. The tendency in formal education to reduce everything to the rational has been challenged in many places, but the entrenched belief in the rational as the only legitimate source of truth has made it difficult to attract serious attention to the possibility that only a part of the human condition is dealt with in school—that schools misportray what it is to think, to experience, to be human. This may account for some attacks on the "relevance" of school learning.

On June 13 and 14, 1975, the Social Science Education Consortium convened a meeting on this problem. "Ways of Knowing: Is Science on the Defensive?" was the name given the conference. Papers were presented, or interactive lectures were offered, and discussions took place. All of the presentations and discussions were recorded by stenotype and transcribed. The present volume presents these papers and discussions in a somewhat edited form.

The papers and discussions are arranged in two broad categories. Those by Richard M. Jones, Alfred Kuhn, and Maxine Greene are in the first group, which discusses the conference theme in principle. These papers deal, in the main, with the nature of the topic itself. The other papers also deal with the nature of the topic, but stress practical lines of action. These are the papers by Arthur W. Foshay, Ronald Lippitt and Eva Schindler-Rainman, Robert Samples, Mark Phillips, and John Haas.

One way of talking about the alternative ways of knowing is to contrast the presumably different functions of the two hemispheres of the brain. The left hemisphere deals primarily with the verbal, the linear, the categorical, the logical, and the right side of the body. The right hemisphere deals primarily with the figurative, the metaphorical, the intuitive, the fantastic, and the left side of the body.

To refer to "left brain" and "right brain," as is done in some of the papers, is to use shorthand. What is discussed in these papers is several modes of knowing, or modes of consciousness. The rational is often called "left brain." Everything else is called "right brain." While there is a limited amount of research by neurologists that supports this way of talking, the research so far is not conclusive. We are constrained by the limitations of the research in this field to be exceedingly conservative in our use of this knowledge—and most of the writers of the papers are conservative, though they indulge in the shorthand of "left brain" and "right brain."

Taken as a whole, the papers, as well as the conference itself, are best understood as a countervailing attempt to claim legitimacy for all those aspects of consciousness that go beyond the rational. They do not deny rationality, as some popular writers during the sixties did. What they ask is that all the aspects of consciousness be recognized as an interacting whole. Several of them claim that when this is done in school, academic progress improves. Some of them offer direct exercises in awakening to consciousness the extrarational aspects of experience, especially with respect to metaphor, dreams, and fantasy. It is worth reemphasizing, however, that in emphasizing these aspects of consciousness, the writers always assume that we function as wholes. To do otherwise would be naive.

The approaches taken by the authors vary, of course. Richard Jones, in contrasting the rational and the literal with the metaphoric idiom and the intuitive, settles on two broad modes of consciousness. He finds in the recall of dreams a way of catching the metaphoric mode in the act, so to speak. Dreams, he asserts, are not the product of work (as Freud implies) but the product of play. So viewed, the consideration of dreams is (he quotes Polanyi) "a dialectical combination of exploration and exegesis." Jones unifies the two—the rational and the metaphoric—asking that we make full use of the rational and continue on to the other modes of consciousness.

Continuing the theme of the two modes, Alfred Kuhn, borrowing ultimately from Darwin, uses the notion of random variation and selective retention (RVSR) to deal with the fact that most experiencing, and much of our consciousness, is random, unorganized, and as such, useless. To extract what is useful, we retain selectively from the randomness what can be patterned or fit into organized ways of knowing. Of course, if we reject the random—if we fail to examine it—we have restricted ourselves to what we already have organized, or to what we already know. Kuhn, in shorthand, refers to random variation as "right brain" and selective retention as "left brain." Since the left brain type of function has long received the bulk of the educators' attention, this conclusion (that educators should attend to both modes of knowing) suggests a significant shift of attention to the role of right brain aspects of learning.

Rationality, says Kuhn, "is the outgrowth and product of both halves of the process. . . only the combination of the two can produce rationality—where 'rationality' includes not only logical consistency and syllogistic thinking, but also the detection of all kinds of ends-means relationships."

Using what she calls "imaginative literature," Maxine Greene not only argues for the complementary relationship between the logical and the metaphoric modes of consciousness but also offers an array of modes. She uses Wordsworth, Blake, Melville, and Dostoevsky, as well as Dewey, Jefferson, Ellul, and many other non-literary writers, to argue for a view of the self that transcends the eighteenth century rational, perfectible man. We should, she says, confront and rejoice in the tension between "inner and outer states." Commenting on the renewed preoccupation with inner consciousness and the "adversary" relationship between the self as we know it privately and science and technique as somehow opposed to inner realizations, she continues: "It is not science or the scientific method. . . that has caused the malaise. Rather, it is the sense that the self as participant, as inquirer, as creator of meanings, has been obliterated."

Greene calls for a process of interior realizations "thrusting out toward the world. . . consciousness may be understood to be all the activities by means of which objects, events, and other human beings present themselves to the knower. . . these acts of consciousness are multiple and varied."

This view, that consciousness is "multiple and varied," is shared or implied by all the papers in this volume.

Arthur Wellesley Foshay implies the view in a paper that pleads for the legitimacy of intuition, and then offers several examples from the usual curriculum offering, of how the intuitive leap may be encouraged in school. The usual didactic of school teaching leaves no room for such leaps. Foshay names two conditions that promote such leaps: that one be saturated in the data, and that the data be offered in a form that invites a leap. This may be compared with Kuhn's RVSR.

Continuing the "what to do about it" emphasis, Ronald Lippitt and Eva Schindler-Rainman call for a "fully linked" person. Knowing, feeling, and doing, they say, are all necessary for the "whole person" to be educated. It's the doing that tends to be left out. "Knowing a teacher's information about educational theory, and plans for teaching a lesson the next day, it is not possible to make a prediction of the teacher's behavior in the classroom the next day. . . . We believe these lacks of linkage are one of the most serious pathologies of human functioning. . . (and that they are) to a significant degree caused and supported by the nature of the child's and the adult's educational experiences."

Lippitt and Schindler-Rainman then proceed to offer examples of non-linkage, to consider conditions causing it, to offer the characteristics of the linked person (who accepts both knowledge and feeling as sources for action; links goals and action steps; learns from both knowing and feeling—and links them in doing), to consider how the educational process might develop the linked person, and to offer applications to other than educational systems. The paper is saturated with reality.

Robert Samples makes a sharp distinction between "right" and "left" hemisphere activities, claiming that in a trusting atmosphere children begin problem solving with right hemisphere activity—"sampling the informal and tacit base of their own experience. Later on. . . they would shift to a left hemisphere mode of thinking and look for specifics and concrete data from the manipulation of the materials at hand." Then they would come back to the right. Shifting and alternation of the two modes "increased in frequency as the learning sequence went on." The reader will notice the similarity of this analysis, again, with Kuhn's RVSR.

Samples explains the dominance of the linear, logical, rationalist mode of thinking in schools chiefly through the lack of trust engendered in classrooms. The linear is perceived as "safe," the metaphoric as "chancy." Children "psych out" teachers with great precision at early ages. When the teacher (or anyone else) seeks to contrive left or right hemisphere activity, children identify the contriving at once, and right hemisphere functioning is lost.

Samples alludes to four types of analogy in right hemisphere functioning which have been identified by W. J. J. Gordon in *Synectics*—fantasy, personal, direct, and symbolic. He offers definitions and examples of the employment of each of these. (See the paper by John D. Haas in Chapter 8 for a further explanation of Gordon.)

Like the other writers, Samples calls for a full use of the two modes of experiencing. Because the rational, linear, syllogistic mode is so dominant, he emphasizes the metaphoric and the intuitive.

Confluent education is the name of a movement carried on in California and elsewhere in which the context of the classroom activity is given full attention at the same time that the manifest activity itself is carried on. Hence "confluent": all the forces present at a given moment are recognized and employed. An older discourse refers to the "latent" and the "manifest" curriculum, or to "tacit" as well as "overt" experience. In confluent education, the latent and the tacit are made overt and manifest.

Mark Phillips, who described confluent education for the conference, uses many examples of the latent messages in the context of the classroom: the ethnic makeup of the class, the feelings present in its membership, the implied messages of support or discouragement that are exchanged, the order of events. In dealing with such matters, it becomes important to deal directly with the private feelings and understandings teachers and students bring to educational activity. The focus in confluent education has been on teacher training—especially the kind that teaches people to take fantasy seriously. Like Samples, Phillips stresses the importance of mutual trust in this enterprise. He would involve students in decisions about what they should do and undergo. Teachers are expected to interpret subtle cues, such as body language, to understand the existing context in their classrooms.

In the context of the other papers in this collection, Phillips' statement is best understood as a "how to do it" explication of the fantastic, the metaphoric, the latent in human experience. Confluent education is personal, involved, often intense, in contrast with the impersonal, detached, objective experience most teachers are said to seek most of the time. In common with the others whose papers are given here, Phillips would have us acknowledge the values of both types of functioning. He sees such whole functioning as stressed in the strategy called the emergent curriculum, in which all the actors in the school situation take full part, at every point. Phillips would, in the last analysis, "combine other ways of knowing with the scientific process in relationship to the one's self."

"Synectics" is a term originated by William J. J. Gordon to refer to the unity of the metaphoric and the analytic in the creative process. John Haas, like others here, pleads that we give full attention to the metaphoric, the fantastic. Gordon has developed a number of exercises with this intent, and Haas has developed others. The paper is full of examples drawn from actual experience. His "synectics excursion" maps the process as a whole—from the divergent to the convergent.

Haas thus joins the others in calling for a full use of the various modes of experiencing. He cautions us against leaving out the ordinary data of experience—feelings, art, literature—and to avoid becoming "bound up" in science and social sciences alone.

Perhaps the best way to consider this field as a whole is also the simplest: to acknowledge that there are several modes of human experience, all of which we use in ordinary affairs. However, in our time, we have acknowledged only one mode—the scientific, the rational, the intellectual.

The scientific mode has become so overpowering that we tend to deny any truth-claiming that does not rest on it. We thus deny what Haas calls "ordinary experience." The scientific mode has become the official mode, so to speak, with the result that we become unhooked from ourselves in pursuing it, thus falling into the pathology of the unlinked person, as Lippitt and Schindler-Rainman put it.

At the same time, we grope for a lost half of ourselves. Our search is reduced

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to groping because of the dominance of the scientific. At the same time that we grope for ourselves, we try to conduct the grope scientifically, like the man who tried to find the soul by weighing a body before and after death. Our fealty to science prevents us from approaching the other aspects of human experience in their own terms.

Nowhere is this confusion more evident than in the language we use. At present, we seek to divide all human experience into two parts, the scientific and the "non-scientific," as we say. We don't even have a term for the other part. Instead, we use many terms. The state of the field appears implied by this plethora of terms: metaphoric, analogous, imaginative, fantastic, dreamy, mystic, and so on. Such language, from a scientist's point of view, is nearly useless.

Yet it serves us well, if we will let it. It is possible that the major strategy—to try to see experience as having two parts—is itself mistaken. Instead of a "left brain" and a "right brain," perhaps we should allow for many brains. That is, perhaps we should allow for the brain to be even more complex than it already seems to be. In reducing human experience into two grand divisions, we may well be preventing ourselves from making distinctions that would aid our attempts to understand ourselves.

After all, words like fantasy, mysticism, metaphor, figurative, and the others all have distinct ordinary meanings. Perhaps the distinctions among them rather than their common property of being "non-scientific" is what is fruitful to examine.

The field seems to be in a transition from an inevitable imprecision to a later precision. Our failure to make distinctions among the various terms we use no doubt arises from our desire to bring order to the field. Such ordering, especially into the scientific on the one hand and everything else on the other, is probably premature and at present may well be mistaken and misleading. We seek the unity and elegance of the scientific fields before we have earned them. As someone has said of education, "We have no Newton, because we have not yet had a Kepler."

The future of the field is strongly implied by these speculative papers. The principle implications of the papers, taken together, seem to be these:

1. There are many modes of knowing, of which the rational, or scientific, is one.
2. We ought to make full use of all the modes of knowing, if we are to function fully.
3. At present, because of the dominance of the rational mode, we need to give special attention to those modes of knowing that are alternatives to it.
4. If we will couple rational modes of knowing with the other modes, our actions will be more effective.
5. The mystic, figurative, metaphoric ways of knowing are prominent in our cultural tradition. They have been known chiefly by poets, artists, philosophers, mystics, and prophets, however, and not by scientists—especially since the Renaissance. There is, of course, some reference by

scientists to the use of these modes of knowing in the process of scientific inquiry. But the interaction of many modes of knowing, stressed in these papers, does not appear to be prominent in the minds of scientists.

The significance of this discussion for education lies in the evidence it provides that the field continues to broaden and deepen itself. The tradition of education can be understood as being like a river that becomes broader and deeper as tributaries feed it and it makes its way onward. Public education began with the glorious but limited purpose of conveying people to heaven through acquainting them with the word of God. To this was added a limited amount of information about this world, then some useful skills, and, during the Progressive period, some acquaintance with social problems and with the arts. To all of this, none of which has disappeared from the curriculum, we now propose that there be added direct experience with the many modes of experiencing that collectively make people human.

Like all the other innovations in education since the seventeenth century, this one will have to fight its way into the curriculum. Every change has had to respond to the attack that it waters down what is well established and thus perverts the purposes of education. Yet all these changes have had, not a diluting effect, but an enriching effect on the offering. So it is with our concern here.

Like other innovations, however, this one is subject to imprecise talk and overclaiming. Like others, it attracts true believers, who purport to reject the main emphasis that has gone before. All the innovations have had to survive such early enthusiasms. Some have not, and have disappeared. It is important for those who would now ask that those aspects of human experience and reflection that go beyond the rational be incorporated in school to understand that it is precisely incorporation that will (or will not) take place. Education has never revolutionized itself, nor has it been successfully revolutionized from outside itself. It absorbs change. It does not perish to be reborn.

The strategy that is most likely to succeed is one that seeks to enrich, not to destroy, what exists.

It is precisely enrichment that the present papers offer. Put in lay language, what they offer is an opportunity for people in formal education to function fully—to become "turned on," as current slang has it. The proposal that we "turn on" students is, in the final analysis, revolutionary, since the policy we generally follow is that we direct students, train them, reduce the randomness of their behavior. It is the tradition of *bildung* or (in French) *formation*, not of release or impregnation. Despite nearly a century of discussion, we do not yet know how to promote growth in schools.

Growth is a property of the organism. We know a good deal about how to prevent growth, and something about how to shape it, but we know far less about how to promote it. It is the promotion of full growth that is the common theme of these papers. We hold out here the hope that children can learn to trust flights of fancy, intuition, immediately perceived truth. We know how to prevent this kind of thing—through the imposition of constraints—but we don't

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know much about how to provoke it.

The present volume is best understood as a beginning. Here we may examine the work of several people who glimpse the power of a fully released person and claim it for education. Much more work needs doing before we can hope for a large-scale application of what is here implied. The promise of such a development, however, is very great.

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THE AUTHORS AND EDITORS

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Chapter 3 — A Perspectival View of Consciousness: Against Dualism

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Chapter 4 — Intuition and Curriculum

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Chapter 5 — Knowing, Feeling, Doing

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Chapter 6 — Toward a Synergy of Mind: Psychological Premises for Education Before 1984

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CHAPTER 1

LOOKING BACK AND FORTH ON CONSCIOUSNESS

Richard M. Jones

In these interstitial comments, the editors will call attention to certain recurring themes that are established and developed in the papers. Some of these themes appear in all of the papers, some are established in one paper and extended in another.

A major theme in the whole of this book is that there are many parts to human consciousness and human experiencing. We tend to value and to teach mainly the rational, scientific mode of knowing. This does not acknowledge great areas of experience, and, in formal education, it results in a misleading view of what it is to be a human being.

In "Looking Back and Forth on Consciousness," Richard Jones deals with two recurring themes: the theme that we must deal with human consciousness as a whole (that is, that dichotomizing the mind, or dealing with only a part of it, is mistaken), and the idea that the two broad groupings of experiencing have long historical roots.

The imbalance between our attention to the rational and to the intuitive or fantastic aspects of human consciousness has a long history. Jones suggests that in pre-historical times there may well have been a different concept of time (the cyclical, not the linear) in the minds of people, and a mode of belief that allowed intuition to rule. At some time in the past, human beings passed over a watershed, and the rational mode and linear time came to dominate their ways of knowing.

Jones explains how dream reflection, a way of allowing the experience of dreams to have a place in waking life which enhances both the rational and the nonrational parts of our existence, has been used productively in his own classes. He closes with a list of ten "things I have learned" about enhancing and integrating the two modes of knowing.

Robert Frost once said: "Science put it into our heads that there must be new ways to be new." Leaving it to poetry, he went on to say, to seek newness through elimination and subtraction. This Frosty thought came back to me as I scanned Ornstein's list (1972, p. 67) of terms regarding the two modes of human consciousness:

The Two Modes of Consciousness:
A Tentative Dichotomy

Who Proposed It?		
Many sources	Day	Night
Blackburn	Intellectual	Sensuous
Oppenheimer	Time, History	Eternity, Timelessness
Deikman	Active	Receptive
Polanyi	Explicit	Tacit
Levy, Sperry	Analytic	Gestalt
Domhoff	Right (side of body)	Left (side of body)
Many sources	Left hemisphere	Right hemisphere
Rogen	Propositional	Appositional
Lee	Lineal	Nonlineal
Luria	Sequential	Simultaneous
Semmes	Focal	Diffuse
I Ching	The Creative: heaven, masculine, Yang	The Receptive: earth, feminine, Yin
I Ching	Light	Dark
I Ching	Time	Space
Many sources	Verbal	Spatial
Many sources	Intellectual	Intuitive
Vedanta	Buddhi	Manas
Jung	Causal	Acausal
Bacon	Argument	Experience

My first reaction to the list was to wonder where I'd been lately, because, although the two modes of consciousness are very important to me, I recognized only a few of Ornstein's dichotomies. Then I wondered where Ornstein could have been, because his list omits all of the dichotomies on which I had been weaned, some of which have become rather dear to me over the years:

Freud	Secondary Process	Primary Process
Piaget	Primary Symbolism	Secondary Symbolism
Piaget	Accommodation	Assimilation
Schactel	Conventionalized Experience	Trans-schematic Experience
Maslow	A Cognition	B Cognition
Taylor	Convergent Thinking	Divergent Thinking
Langer	Discursive Symbolism	Presentational Symbolization
Polanyi	Focal Awareness	Subsidiary Awareness
Neisser	Sequential Processing	Multiple Processing
Kubie	Conscious Processing	Preconscious Processing
Wertheimer	Productive Thinking	Blind Thinking
Bleuler	Realistic Thinking	Autistic Thinking
Many sources	Public Knowledge	Private Knowledge
Many sources	Literal Meaning	Metaphorical Meaning

Now I have a proposal to make: Let us resolve that the next one who coins another pair of terms for the two modes of human consciousness be required to do nothing for a year but read and write poetry, thereby perhaps being instructed into the virtues of seeking newness by elimination and subtraction. Because, really, the terms we have, while admittedly having various shades of difference between them, are more than sufficient to support consideration of the two modes from a variety of conceptual levels and points of view. And because I suspect that temptations to extend the list are but manifestations of resistance to the more pressing challenges of 1) better understanding how the two modes of consciousness interact and 2) better understanding the conditions in which they optimally interact.

So that's the first thing I want to say: Let us stop stuttering in this matter of naming the dualities of consciousness. Then I want to say something about the evolution of consciousness. Then I want to share what little I know of the psycho-social conditions conducive to optimal interaction of the two modes in school settings.

The Evolution of Human Consciousness

The works of Alexander Marshack (1972) and Norman O. Brown (1959, 1966) have in the past two decades dramatically expanded our knowledge of the evolution of human consciousness. Marshack's work involves an extremely precise and analytical, although highly intuitive, breakthrough in archeology ("cognitive archeology," as it is getting to be called). Brown's is a highly speculative, although exceedingly well disciplined, contribution to the psychoanalytical understanding of history and prehistory. Both men, it is instructive to observe, worked way outside their home disciplines of professional writing and the classics, respectively. There is not time, nor is this the place, to outline Marshack's and Brown's works in their formidable details; I shall have to risk misrepresenting them as I attempt to draw their implications to present purposes.

Marshack, by applying an ingeniously conceived series of new observational and analytical methods to collections of inscribed prehistoric stones, bones, tools, and works of art, makes a persuasive case that the basic modalities of human consciousness are no different today than they were at least 40,000 years ago. These modalities are visual, kinesthetic, symbolic, time-factored (cyclical or unilinear; see below), and storied or storifying, a conclusion that was anticipated in the philosophy of Ludwig Wittgenstein. All that differentiates modern thought patterns from those of upper Paleolithic Man, concludes Marshack, is our more abundant store of observations on the recurring physical and biological processes that matter to us and our more refined technological resources for amplifying these observations.

> Art, symbol, rite and notation operated within a culture that for some 25,000 years had a certain basic homogeneity, a hunting way of life with a lore and mythology based on that way of life. For us the important thing is the combined evidence for an evolved, modern, cognitive and symbolic

> capacity found in the earliest levels to the last. Though traditional categories such as magic and myth, aggression, symbolism and sexuality are elements in the stories, the whole might more aptly, if awkwardly, be called a cognitive-and-time factored use of art, myth, rite and symbol.
>
> . . . Every process recognized and used in human culture becomes a story, and every story is an event which includes characters (whether spirit, god, hero, person, 'mana,' or, in modern terms, element, particle, force, or law) who can change or do things in time. . . Since every story can potentially end in a number of ways, efforts would be made to participate in the story, and therefore, to change or influence the story or process or to become meaningfully a part of it. When such acts become traditional, we can sometimes call them 'magic' or 'religious.' The specific content of these storied efforts would vary from culture to culture. But the cognitive, symbolizing processes would not change, and the basic nature of the storied equation would remain. (Marshack 1972, pp. 117, 119, and 283)

Norman O. Brown, by applying psychoanalytic theory in history, literature, religion, and cosmology, makes a persuasive case for there being two critical differences which set historic and prehistoric consciousness off from one another: 1) A difference in the time-factoring within the frames of which the stories prehistoric people told each other (whether artistic, magical, or religious) and the stories historic people have told each other (whether artistic magical, religious, or scientific) have been phrased. 2) A difference in the predominant qualities of symbolization engaged in composing, communicating, and responding to those stories. Brown did not venture a guess as to when the change occurred; it was probably not more than 40,000 years ago, nor less than 6,000; but the differences are clear. Once upon a prehistoric time, people lived primarily in cyclical or revolving time and perceived in their stories primarily metaphorical meanings. For at least 6,000 years, historical people have lived primarily in unilinear or cumulative time and perceived in their stories primarily literal meanings. Each of these views entails a radically different way of relating to death, life, nature, personality, parenthood, childhood, knowledge, society, education, and progress.

So completely encased is historical mentality in the unilinear time frame that it is next to impossible for us to even imagine what the shapes and contents of human experience might be like in cyclical time (unless our dreams seek to reveal it to us). It's the old problem of the fish and the water. Thus we find Brown, under the influence of such minds as Blake's, Bachelard's, Nietzche's, Roheim's, and, of course, Freud's, attempting to articulate his vision of cyclical time in aphorisms like this:

> Another scheme of time, another scheme of causality. Prefiguration is not preparation. 'When we speak of the relation between a new poetic image and an archetype asleep in the depths of the unconscious, we will have to understand that this relation is not, properly speaking, a causal one.'. . . Events are related to other events not by causality, but by analogy and

> correspondence. . . . The potentialities are latent till made patent; asleep till wakened. The events sleep in their causes; the archetypal form is the hidden life of things; awaiting resurrection.
>
> Newness is renewal. . . . Life is Phoenix-like, always being born again out of its own death. The true nature of life is resurrection; all life is life after death, a second life, reincarnation. . . . The universal pattern of recurrence bears witness to the resurrection of the dead. (Brown 1966, pp. 209, 206)

And, although the addiction of modern mentality to literal symbolism is somewhat less total, by virtue of the occasional spells we allow poetry to cast on us (and, again, by virtue of our dreams), the serious business of modern living is experienced and communicated by almost all modern people, almost entirely, in literal symbols that are unrefreshed, if not alienated from, the genies of metaphor. Quoting Brown again:

> The dead letter. The dead metaphor. It is only dead metaphors that are taken literally, that take us in. Language is always an old testament, to be made new; rules, to be broken; dead metaphor, to be made alive; literal meaning, to be made symbolical; oldness of letter to be made new by the spirit. The creator spirit stands in the grave, in the midden heap, the dunghill of culture (as in *Finnegans Wake*); breaking the seal of familiarity; breaking the cake of custom; rolling the stone from the sepulcher; giving the dead metaphor new life. (1966, p. 207)

I am led by these considerations to conclude that for human consciousness to have evolved from its prehistorical life of metaphorical meaning in revolving time to its historical life of literal meaning in cumulative time there must have taken place, once upon a series of times between about 10,000 and about 6,000 years ago, many ritualistic counterparts to this conference, wherein was spoken (or sung or danced or chanted or played) some radical mutterings to the effect that the "right cerebral hemisphere" was hogging too much of the action; life would be enormously more predictable, perhaps even the fabric of society preserved, if ways could be found to give the "left cerebral hemisphere" a little more headroom! The imagery may be ridiculous, but the evidence it seeks to dramatize is persuasive: a full circle has probably turned in the phenomenology of human consciousness from metaphorical meaning in cyclical time to literal meaning in unilinear time. It has turned from the almost total subordination of A cognition to B cognition to the almost total subordination of B cognition to A cognition. All the while the size and structure of the human brain has changed but a trifle, and the basic modalities of consciousness have changed not at all.

The New Revolution in Human Consciousness

It is in this perspective that I like to look ahead as we seek to trim both our intuitive and our rational sails to what may already be in the wind for the eventual development of human consciousness. Here I take my readings from Michael Polanyi (1958), whose story has persuaded me, as it did George Klein and Abe Maslow before me, that a turning point is taking place in the historical development of human consciousness which is of a smaller order than, but which is closely analogous to, the larger turning from prehistorical to historical consciousness. This turning is taking place within the history of science. Polanyi, as you know, has contributed not one but two pairs of dichotomies to our lengthy list of epistemological stammerings: articulate and tacit knowledge, focal and subsidiary awareness. Nothing was added by the coining of these terms to what Freud had already given us in his conceptions of the secondary and primary processes, respectively. However, I am willing to indulge Polanyi's redundance out of gratitude for his having given his epistemology an historical dimension which was lacking in Freud's:

> *Modern man is unprecedented; yet we must now go back to St. Augustine to restore the balance of our cognitive powers. In the fourth century, A.D., St. Augustine brought the history of Greek philosophy to a close by inaugurating for the first time a post-critical philosophy. He taught that all knowledge was a gift of grace, for which we must strive under the guidance of antecedent belief: *nisi credideritis, non intelligitis*. His doctrine ruled the minds of Christian scholars for a thousand years. Then faith declined and demonstrable knowledge gained superiority over it. By the end of the seventeenth century, Locke distinguished as follows between knowledge and faith:
>
>> How well-grounded and great soever the assurance of faith may be wherewith it is received; but faith it is still and not knowledge; persuasion and not certainty. This is the highest the nature of things will permit us to go in matters of revealed religion, which are therefore called matters of faith; a persuasion of our own minds, *short of knowledge*. . . (my italics).
>
> Belief is here no longer a higher power that reveals to us knowledge lying beyond the range of observation and reason, but a mere personal acceptance which falls short of empirical and rational demonstrability. . . .
>
> Here lies the break by which the critical mind repudiated one of its two cognitive faculties and tried completely to rely on the remainder. Belief was so thoroughly discredited that modern man lost his capacity to accept any explicit statement as his own belief. All belief was reduced to the status of subjectivity: to that of an imperfection by which knowledge fell short of universality.
>
> We must now recognize belief once more as the source of all knowledge. Tacit assent and intellectual passions, the sharing of an idiom and of a

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> cultural heritage, affiliation to like-minded community: such are the impulses which shape our vision of the nature of things on which we rely for *our mastery of things. No intelligence, however critical or original, can* operate outside such a fiduciary framework. (Polanyi 1958, p. 266)

As I read Polanyi, the development of science, with its subjugation of tacit knowledge and subsidiary awareness to articulate knowledge and focal awareness, was a necessary and valuable liberating influence, given the extent to which the capacity for belief had become tied to illusions and theocratic dogmas. But, as I read Polanyi further, this revolutionary achievement of science has now occurred and is irreversible and safely established as one of the basic precepts of human consciousness. The further development of historical consciousness requires taking this achievement for granted. It also requires that we restore to our capacity for *doubtless knowing* our capacity for *truly believing* in what we know.

Science, now, has nothing to defend itself against, except its own defensiveness. Efforts to re-emphasize the primary processes of metaphorical meaning can only serve, now, to capitalize on the achievements of science. This is not done by substituting subjective belief for objective knowledge, which science has made impossible, but by investing the acquisition of objective knowledge with intellectual passion and qualities of personal conviction which, as contemporary students and teachers well know, the acquisition of knowledge can lack. We will capitalize on science, not by taking the labor out of learning, which science has made impossible, but by making learning a labor of love which science has made possible.

According to Polanyi the word for the ruling of human intelligence, from now into the foreseeable future, is "fiduciary." I wish he had chosen a prettier word. This must have been what Whitehead meant when he said "It is more important that a proposition be interesting than that it be true. The importance of truth is that it adds to interest." (Smith 1973, p. 2) And what Piaget meant when he said: "Intelligence begins neither with knowledge of the self nor of things as such but with knowledge of their interaction, and it is by orienting itself simultaneously toward the two poles of that interaction that intelligence organizes the world by organizing itself." (Quoted in Flavell 1963, p. 62)

Dreams: Analysis and Reflection

Here's an example of this watershed that has been created by science's achievements, taken from my own teaching experience. I have long been interested in dreams from a variety of viewpoints, and have for a long time encouraged my students to relate their dreams to their schoolwork. Dreams are the most nearly pure expression of the primary process it is possible for normal people to experience. Schoolwork, as we typically go about it, is about as excessively weighed down by the secondary process as anything we ever do in life. So, as the initial hunch went, if I could find an enjoyable and productive way of making dreams and schoolwork pay attention to each other, I might find a way of encouraging the integration of the primary and secondary processes (otherwise known as creative thinking) in my classes. The trouble for a long time was that it proved difficult to do this enjoyably, much less productively. After learning how to remember and record their dreams the students would, with my help, learn how to analyze them. After a month or so of this they'd become either bored or annoyed, stop recording their dreams, and eventually go back to not remembering them. So there I was, left holding this perfectly good theoretical bag with nothing much in it. Then, about five years ago, the students began responding in such good humored, ho-hum-ish ways as to cause me to shift from an analytical to a reflective posture in respect to their dreams—from the bias of viewing dreams as the products of *work* to the bias of viewing dreams as products of *play*, from the bias of viewing dreams as analogous to *neurotic symptoms* to the bias of viewing dreams as analogous to *artistic visions*, from curiosity about the *causes* of dreams to curiosity about the *effects* of dreams, and from investing authority in the objectivity of various dream analysts to investing authority in the subjectivities of the dreamers.

My next book, *The Dream Poet* (in press), will show how very enjoyable and productive is this approach. But, I ask myself, why has it only been of late that my students and I have been prompted to go beyond the analytical to the reflective posture in respect to our dreams? According to Polanyi, what I am doing when I ask my students to try to comprehend Melville, say, or Chaucer or Shakespeare, in the light of reflecting on their dreams, is following, of all things, St. Augustine's maxim: *nisi crediteritis, non intelligitis!* As explained by Polanyi, this means ". . . the process of examining any topic is both an exploration of the topic and an exegesis of our fundamental beliefs in the light of which we approach it; a dialectical combination of exploration and exegesis." (Polanyi 1958, p. 267) In the margin I have: "That's it; that's what we try for in dream reflection seminars: a dialectical combination of exploration and exegesis!" But does this mean I'm regressing to a pre-scientific stance? No, and now I understand why Polanyi gave his book the subtitle "Towards a Post-Critical Philosophy." Although the students all those years were reading Freud, for the most part sympathetically, they had not yet come to take him for granted. Science had shown that by first doubting our experience and then disproving our doubts an unprecedentedly critical understanding of nature could be achieved. Freud showed that the same could be done with respect to *human* nature. For example, when he took up the study of dreams what did he do? He first doubted that the dream as experienced was meaningful, and then disproved the doubts by tracing the interrelations between the meaning*less* manifest content and a meaning*ful* latent content. In the process he showed us how we could achieve an unprecedentedly critical understanding of ourselves.

My earlier students, I surmise, while they understood Freud, were still trying to believe in this accomplishment. I doubt, therefore, that they would have felt it safe to adopt my present guidelines regarding the locus of authority in dream reflections, and our emphasis on interest before truth. My present students, it seems, have turned this corner; they know that the scientific wherewithal exists with which to be critical of themselves. So secure are they in this knowledge that even while they are using it they tend to ask, "Yes, of course, and what else?"

So, as we look ahead in institutionalized education, I think we should have as little patience with rationalists on the defensive as with intuitionists on the offensive, because there is no choice, now, but to take advantage of the achievements of science, by taking them for granted, and then moving not against but beyond them. That old horse is dead; that old contest is over. The name of the game, from now on, is "fiduciary."

Optimal Interaction of the Two Modes

Nevertheless, we presently find ourselves, in our schools, having to cope with a very sluggish cultural lag, in which curricula continue to be developed that give seriously short shrift to the private, subjective, subsidiary, assimilative, presentational, divergent, metaphorical ways of knowing, in contrast with their often exclusive emphasis on the public, objective, focal, accommodative, discursive, convergent, literal ways of knowing. Teachers continue to be trained away from their good impulses to redress the imbalance through their own artistry, by means of which any curriculum could be honestly and interestingly taught. What we most need, in order to turn this corner, is not more terms for the two basic kinds of consciousness, but more knowledge of how they interact in the achievement of specific kinds of learning objectives and more knowledge of the psychosocial conditions conducive to these various kinds of interaction.

Ten Suggestions

I wish I had more such knowledge than I do. I wish my ignorance in these matters was not shared by you as much as I fear it is. What I do know I have learned from practical teaching and learning experiences, and from written accounts by creative persons of how they go about learning. Only a little of this knowledge has come from a study of psychology. What I have learned is this:

1) In the times in which we live it is the idiom of metaphor which is the elusive one, the one that needs to be coaxed and courted into intercourse with the idiom of literality.

2) The metaphorical idiom tends to be attracted into interaction with the literal idiom under two kinds of conditions—paradoxically, very opposite ones: the conditions of what Herbert Silberer named "apperceptive deficiency" and "apperceptive insufficiency."

> *Apperceptive deficiency* refers to situations in which a person finds himself mentally off his game. He is unable to maintain rational mastery of intellectual achievements which are normally routine for him, and falls back, as it were, on their prerationative approximations. He may be fatigued, or sleepy, or have had a few, or be in a fevered condition, or in an emotional conflict, or under influence of drugs, or in some other way have lost the fine edges of his optimal mental state. *Apperceptive insufficiency* refers to situations in which a person is at the top of his form, in full

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> command of his optimal mental state, but has momentarily assumed challenges which just barely elude his best intellectual efforts. He may then receive an assist from these same prerationative approximations. We sometimes call this "inspiration."
>
> Silberer arranged to catch these passing prerationative assists on the fly, so to speak, by training himself to observe his reveries under a delicate blend of the two conditions. At the first signs of drowsiness he would set himself to contemplating some intellectual problem of which he was not yet quite master. When the literal thought process gave way to its metaphorical sequel, he would alert himself to full wakefulness and ponder the two versions of what he called the "autosymbolic phenomenon." (Jones, pp. 66-67)

> *In a state of drowsiness I contemplate an abstract topic such as the nature of transsubjectively (for all people) valid judgments. A struggle between active thinking and drowsiness sets in. The latter becomes strong enough to disrupt normal thinking and to allow—in the twilight state so produced—the appearance of an autosymbolic phenomenon. The content of my thought presents itself to me immediately in the form of a perceptual (for an instant apparently real) picture: I see a big circle (or transparent sphere) in the air with people around it whose heads reach into the circle. This symbol expresses practically everything I was thinking of. The transsubjective judgment is all the heads. The validity must have its grounds in a commonality: the heads belong all in the same homogeneous sphere. Not all judgments are transsubjective: the body and limbs of the people are outside (below) the sphere as they stand on the ground as independent individuals. In the next instant I realize that it is a dream-picture; the thought that gave rise to it, which I had forgotten for the moment, now comes back and I recognize the experience as an "autosymbolic phenomenon." What had happened? In my drowsiness my abstract ideas were, without my conscious interference, replaced by a perceptual picture—by a metaphor. (Silberer 1951, p. 198)

Not the least provocative intimation of Silberer's studies is that our creative thoughts may often be thus composed of our weakest and strongest lights.

The rest of what I know about coaxing the metaphorical into commerce with the literal consists of a series of less pedagogically awkward ways of replicating Silberer's lonely experiments. They are:

3) Getting to know a whole helluva lot about some one little thing, and then tackling something difficult that you know nothing about. The little thing you know a lot about has a way, then, of reacting to your approach to the thing you

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know nothing about by sending up metaphors, which have a way of lighting your way into the new subject with insights to which experts in the subject might be blind. It is instructive that the most dramatic recent advance in archeology has been made by a popular science writer, and that the most dramatic recent advance in psychoanalysis has been made by a classicist. The inducement of mind sets conditioned by apperceptive insufficiency is how I account for this.

4) Interdisciplinary study. The focusing of several bodies of knowledge on specific problems stimulates conditions of apperceptive insufficiency.

5) Learning by teaching. The responsibility stimulates conditions of apperceptive insufficiency.

6) Teachers encouraging and rewarding *interesting* as well as "right" responses, by including in routine recitation, discussion, and evaluation procedures appeals to metaphor, analogy, paraphrase, and other thought processes the function of which is to make the strange familiar, and the familiar strange. Children should be led to expect that when asked what a thing *is*, it is not only permissible but frequently desirable to say what it *is like*, what it is *as if*, what it is *not* but might more enjoyably be thought as, what it reminds one of or makes one feel; what, in short, it is *as it were*.

7) Encouraging students to personalize public knowledge. Elizabeth Simpson, in her recent report to the Ford Foundation on "confluent education," put it this way:

> Whatever truth, grace, and beauty are our monumental heritage, it is not enough; for I, too, must be an ancestor as well as a descendant, a progenitor as well as seed from the past. . . . My knowledge is never inherited experience. It is my own, the gift of myself and not the gift of others, however much they deem it greatness or I identify myself with those who value it. It is the workings of my responsive self, my consciousness—the view from within—a most private place to which only I have access. . . .
>
> There is in my own inner life the authority and the gear that will link me to the ages. . . . From varied historical contexts, from the forms, the ideals, the values, the beliefs of the cultures which are specifically ours, we draw the supportive structures of our beings, but not from these alone. The data are ultimately ourselves. *That* poetry is home-gardened and gathered; it is kitchen-yard psychology and it is true. (Simpson 1974, pp. 6-7)

"Kitchen-yard psychology. . . home gardened and gathered" is the kind we try to cultivate in our dream reflection seminars. Here's one of my favorite examples:

The Text of
MOBY-TRICK: or THE TALE

—Frank Greenhalgh

"There are certain queer times and occasions in this strange mixed affair we call life when a man takes the whole universe for a vast practical joke, though the wit thereof he but dimly discerns, and more than suspects that the joke is at nobody's expense but his own."

"Though in many of its aspects the visible world seems formed in love, the invisible spheres were formed in fright."

—Melville in *Moby Dick*

A great big old three-story house up on stilts—the beginning of Linda's dream—strikes me with the same feeling tone as the classical opening of fanciful stories, tall tales; viz., "Once upon a time. . .", a line that seems an implicit and apt prefix to the dream.

What is the activity proper to one whose spirit is informed by the sense of the world as a vast joke, dim and oblique as that intimation may be? Why, to plunge into the play of energies, surrendering the greatest part of the self to go with the flow, so as not to miss the point of pointlessness; to remain buoyant in accepting the part of the joke that falls to one's lot. What of the rest of the self, not so involved? That is the observing self, whose equable detachment is bred of understanding; it has no fixed locus, but instead can rove in imagination to different spaces and times, bringing new perspectives to bear on happenings in the present. In short, by a certain detachment from the immediate, the observing self can reflect, and so enrich the here-and-now.

But what if the joke has a malevolent cast, if indeed the invisible spheres were formed in fright? Or, which is worse, if there is no joke at all, no objective relief from the serious matter of inhabiting a universe behind which lurks only an unthinkable horror? Perhaps the natural impulse will allow of nothing but recoiling, or a willed forgetting. Then, to fill the void left by such repudiation, we spin out our names and stories and dreams in large letters, populating the vacuity with our new creations, embellishing the malign order of the world with mythological constructs fashioned of our own sweat and blood. In a deep and not unambivalent sense, we learn to play, to entertain ourselves—which amounts in the end to another kind of joke.

The author of that piece is admittedly a brilliant student, but he did launch those incredible insights from reflections on the dream of a fellow student. In the process, he was able to personalize a great piece of public knowledge in a very artful way.

8) Expecting the purely personal self-knowledge that may be gained by these means to extend itself back into the public domain, by amplifying this or that aspect of culture via some expressive act. Here is where I think some of our "affective education" enthusiasts miss the boat, when they are content to

merely help their students become more sensitive to their inner lives and to their personal relations, and refrain from encouraging the second effort of making increased self-knowledge a means to the end of enriching public knowledge. Not that I oppose pursuing personal objectives in schools. On the contrary, personal objectives are achieved more lastingly and with more satisfaction when the skills and insights involved are *also* addressed outward, so that the student can experience the difference that self-knowledge makes, not only to the self but to the knowledge.

There is a fine line between art and exhibitionism to which both the students and the teacher must keep attentive when this return trip from private insight to public expression is encouraged. Every artist is familiar with the danger of merely expressing self, without regard for considerations of craft and style which invite an aesthetic response from an audience, rather than a merely sympathetic one.

I do not, of course, insist that the full round trip from public to private and back to public *always* be made, much less that it always be artfully made—only that *in a school setting* this is the standard that should define optimal success. If I may quote Piaget one more time: "Intelligence begins neither with knowledge of the self nor of things as such but with knowledge of their interaction, and it is by orienting itself simultaneously toward the two poles of that interaction that intelligence organizes the world by organizing itself." (Quoted in Flavell 1973, p. 22)

9) Actively involving dreams in the educative process. Dreams, as the most natural products of regular apperceptive deficiency, are the cheapest access we have to our home gardened and gathered metaphors. There they sit, morning after morning, ripe for the picking. All that's required is to remember them, write them down and bring them to school, where they almost magically transform themselves, in relation to the school work, into bottomless sources of healthy apperceptive insufficiency. One of my students recently put it this way:

> The uncertainty is still here within each of us, every Friday. But rather than holding us back, spontaneity stifled, we become instead almost child-like in freedom and vitality of mind. And then the afternoon writing shows that we are anything but children. The quality of uncertainty characteristic of the dream reflection seminar seems to act as a catalyst freeing our thoughts from their usual musty pathways. The integrity and quality of "the play" becomes the prevailing concern. Everyone becomes more sensitive to everyone, more civil, more thoughtful, more human. And, as is true of a good play, the sign of a good dream reflection seminar is always lots of hearty laughter.

10) Curricula in the arts, the humanities, and the social sciences which seek to present the realities of the human condition as they exist and have existed. These subjects are too often presented in quaint and trivial ways, especially in the elementary and secondary grades. It is in these curricular areas that public truths and private interests can most naturally intersect, to the mutual enrichment of both. An example of a curricular effort that seeks to present the realities

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of the human condition as they exist, and have existed, is *Man: A Course of Study*, which has been the subject of a recent controversy. Of course, it can be taught poorly. What can't? But it also can be taught well, which is more than can be said of most of the elementary social studies curricula with which I am familiar.

DISCUSSION

Peter Dow: Dick's reference to *Man: A Course of Study* reminds me of an interview I had recently with Jerrold Zacharias, who was an important figure in the curriculum movement of the 1960's—which, as you know, put a lot of emphasis on cognition and structure. One point he made was that what nobody ever talked about at that time was what he called intuitive knowing. As Zacharias went on in that particular conversation, complaining about Jerry Bruner and *The Process of Education* and the tremendous emphasis on the importance of structure, he said, "You know, the really extraordinary thing about doing science is when you are working on the cutting edge, where there is no structure, where there are no guidelines and where knowing is largely intuitive, metaphorical, and imaginative. That is when the real breakthroughs come," he said.

So there is not as wide a gap as one might think between Richard Jones and Jerrold Zacharias.

Dreams: Analysis and Reflection

Jack Fraenkel: Professor Jones, I wanted to ask you a question about a statement you made earlier which you went over rather lightly. You said that in your classes you recently switched from an emphasis on analyzing dreams to reflecting about dreams. Is that correct? I wonder if you would comment a bit more about the distinction, and how you work with it.

Richard Jones: I cannot be satisfied with my answer because the answer to the latter point is very lengthy. The difference between the analytical and reflective postures is simply this. It is not one of substituting the reflective posture for the analytical one. Many, many dream interpretations are made, many analyses are made, but the prevailing tone, the prevailing expectation in the minds of the students and myself is that this is just in passing. We do the interpretations in passing.

What we are really after is something that will allow us to enjoy the dream, to appreciate its artistry—its sound symbolism, for example. Dreams are really very cute when you pay attention to how they are put together. First you should identify the day residue, which is very simple; the dreamer can tell you in a minute what that situation was from the day before or what the particular perception was that the dream is playing with. Then, if you spend an hour simply trying to appreciate the architecture of the dream itself—its artistry—it makes for a very, very lively and fun discussion.

Fraenkel: Would this be a fair analogy? Once someone said, "Get off all those questions, man, and just dig it." I just wonder—

Jones: Okay, but it is not substituting the digging it for the questions. It is asking the questions, getting the answers and then saying, "What else is new?" What is interesting about the dream?

The Dichotomy

Irving Morrissett: In Ornstein's two lists, to what extent do the items within each list overlap and to what extent are they different?

Jones: In those dichotomies, including the ones I added,there is a great deal of overlap, but also diversity. I think the only two that are synonymous are Freud's secondary and primary processes and Piaget's primary and secondary symbolism. They mean exactly the same thing. But, in all the others, while they overlap greatly, there are shades of difference and I am sure each of them has been coined by a theorist who was particularly interested in one or another point of view regarding the two modes of consciousness.

But, unless someone comes up with a really groundbreaking new insight into human consciousness, we can probably do with the terms we have. I was serious when I suggested that it is possible that we keep naming these things out of resistance to accepting the real challenge, which is understanding how they optimally interact. I stand behind my ten points. They make sense to me. I am sure they do not represent an iota of what we are still ignorant of regarding the conditions which are conducive to these two modes of consciousness interacting in a creative fashion.

Jack Nelson: Why is it that we appear so trapped in a kind of dualism, like the dualism of mind and body? There is a kind of mystique about the notion that there is a polarity of equals. It seems to me like the old religious notion of the Trinity. It seems to have a religious fiber to it rather than what might be empirically demonstrable or logically constructed. That is a kind of preface, leading to a question about your description of the dichotomy. It excludes any other way of looking at the way organisms act and react and interact or, as I prefer, transact.

I am concerned that we are caught in a kind of dualism that I think is not philosophically supportable. Isn't there a third or a fourth or a ninth or a 117th part of it?

Private and Public Knowledge

Arthur Wellesley Foshay: Two or three times you drew a distinction between what I understood you to call private knowledge and public knowledge. You said at one point something like "you have to do something with it," which is to say you have to make it public. That is troublesome for me. Why do you have to make it public? Does this make it real? Is it any more real because it is public? Is there not such a thing as real private knowing?

Jones: I certainly do not think that going public should be required. I do not think anything should be required. But I think the expectation should be there that a piece of self-knowledge should try to go public again.

Foshay: Why should it?

Jones: Because the self-knowledge itself, I believe, is more acceptable, is more readily integrated into the person's total personality. This applies particularly in school settings. People come to school to learn, to increase their knowledge of public knowledge and their assimilation of public knowledge.

Foshay: So things are more or less legitimate in public school according to how public they are?

Doug Alder: Couldn't students write things down without sharing them?

Jones: Sure. They can write in notebooks and not show anybody. As far as I am concerned that is public, because you cannot write anything without having an audience. By public, I do not mean exhibiting it, spilling your guts out all over the place, I mean relating it to books read, papers written, plays performed, paintings painted, etc., etc.

Alfred Kuhn: I would like to amplify that. I think this is a process of externalizing something that is inside you. In the process of externalizing it where you can observe it and then getting the feedback in to you from what you have externalized, you have a better idea of what was already in your head.

In the process of externalizing it, it itself helps you to make jell whatever is in there. In the same sense, I have often said I cannot think without a typewriter. It does not matter whether anybody else ever sees what I put down, but just the process of trying to put it down does a great deal.

Cyclical Time

Michael Wertheimer: It occurs to me that cyclical time has been a major theme in Latin American literature during the last three or four decades. Why do you get cyclical time so strongly in that kind of culture and not in what we normally think of as Western culture?

Jones: What I have learned most about cyclical time is indeed from a South American poet or artist; his name is Octavio Paz. His is the book I want to read closely next—I have only thumbed through it—because I find it terribly frustrating that I cannot envision cyclical time. I desperately want to be instructed by someone like Paz who apparently can visualize cyclical time.

Metaphoric Teacher Education

Glenn Linden: Based on what you said, what would you do with a group of teachers to move them in the direction that you obviously feel is very important? Would you put them through some sort of process, helping them move into the metaphorical way of thinking? It seems to me what you are saying involves participating, not instructing. If some of us felt we wanted to try to apply some of this, what would we do?

Jones: If I had a group of teachers, I would run a dream reflection seminar with them for a while.

Linden: You say you are interested in getting them to move in this direction.

If they were not interested in working with dreams, but interested in moving in this direction, would dreams be the best way to do it?

Jones: I have seen it done with art work and poetry. There are all kinds of media that stimulate the metaphorical process. I just happen to think that dreams are the easiest and the best way to start because they require no artistic skill whatever. All that is required is a little self-discipline in remembering and writing dreams down. Once a teacher or student has remembered them, written them down, and brought them into the classroom, something creative occurs to that teacher or student from there on out.

But I do not know why it is that when the word "dreams" is mentioned everyone begins to think of something exotic and something that requires an enormous amount of training and skill. Not at all. I have had teachers who have visited my dream reflection seminar two or three times, joined it, and then gone out and adapted it to their own subject. There have been one in philosophy, two in literature, and one in sociology, and they are doing it very well.

They adapted to their own style and their own personality, so they do it differently. However, they all followed the basic ground rules of just getting the students to remember their dreams, write them down, bring them in and show them, and relate them to their school work.

Is the Right Brain "Scientific"?

Angus Gunn: Your position is that there is more than the traditional rational processes by which we establish scientific knowledge. In what sense do you claim scientific knowledge or scientific reliability or validity for these alternative ways of knowing?

Jones: That is a tough one. I will say what is on my mind. Science does play; in Polanyi's terms, it plays the doubting game. Whatever you believe, whatever you intuit, is assumed to be erroneous. You start by doubting. I start by doubting that this table is hard and then I disprove my doubts. That is science. And it has been enormously useful in helping us to be critical and to understand nature, including human nature.

Polanyi is simply saying that it is safe now to go back to the other approach to ignorance and begin with belief. I believe it to be this. And to put the emphasis on interest—not rather than truth, but interest along with truth.

Gunn: Are you defining science as a negative activity?

Jones: Not at all. Science has freed us from centuries of bondage to the belief that intuition and belief are tied to theoretic dogma. I am saying this is already achieved. We do not have to worry about it any more. If I come around and say, "Look, dream reflection is God's gift to education," and somebody says, "How do you know that?" I say, "I do not know it. I believe it." It is safe for me to say that, because if it is wrong, somebody will disprove it.

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CHAPTER 2

RVSR: THE COMPLEMENTARITY OF RIGHT AND LEFT

Alfred Kuhn

Alfred Kuhn introduces another theme that recurs elsewhere in these papers: the idea of alternation between the linear mental functions and the metaphoric, or intuitive, or fantastic. Kuhn's random variation and selective retention (RVSR) allows for thinking to involve the whole of the brain, though there is some difference through time in which part of the brain is used. This idea is discussed at several points in the present collection of papers. The two aspects of thinking are seen as complementary.

This view of the wholeness of the intellectual functioning is in contrast with some recent writing that seems to discount the function of rationality, or "objective consciousness." Far from discounting the importance of the rational, Kuhn and the other writers seek to place rational functioning in a setting that makes use of all of our powers. Rationality, he is at pains to point out, is the "outgrowth and product of both *halves of the process."*

The dominant idea in Kuhn's paper is his concept of RVSR. Both in the paper and in the discussion that follows it, he emphasizes that while what he calls "scatterbraining"–the RV, which others have called "brainstorming"–is necessary, indeed essential, most of it is of no value. Hence the importance of selective retention of what is seen as useful or productive. Both processes are necessary if one is ever to have an idea that is both new and useful.

I will start with the to-me familiar model of man which constitutes Chapters 4 and 5 (mainly 5) of my latest book (A. Kuhn 1975), addressing myself explicitly to the question, "What is the complementary relationship between the two modes of knowing?" Though for convenience I will talk of right brain and left brain, please understand that I am referring to the two modes, without implying that they are or are not spatially concentrated in those regions. Some even suggest that the two modes are associated with *levels* of brain activity, not locations (Martindale 1975). Furthermore, since I have had the temerity to add a couple of items to the already long list of names for this dichotomy, I suppose that under Richard Jones' prescription I now stand self-sentenced to a year or two at reading and writing poetry.

The Nature of Learning

Perhaps I should also specify that I take a definite position about an epistemological question that some consider important to the problem of learning. To explain by analogy, I point a camera at a tulip, click the shutter, and develop the picture—in one of those older Polaroid cameras that developed the picture inside the camera. From this illustration I think you will understand what I mean when I speak of the difference between an external reality and an image of that reality inside the information-processing mechanism. Though I accept, indeed proclaim, that a person *responds to* his images, and not to reality as such, I think that a workable philosophy of education should assume that there *is* an external reality, much of which is quite independent of man's images of it.

Depending on the lens, film, focus, distance, angle, lighting, and other factors, a camera can produce very different kinds of images of the tulip. So can a human brain produce many different kinds of images of any segment of reality, depending on *its* information inputs and processing mechanisms. The difference between camera images and brain images—and a difference that is crucial to education—is that camera images are isomorphic, whereas brain images are symbolic and organized. No matter what lens, film, or developer is used, there is a certain kind of point-to-point correspondence between segments of the tulip and segments of the photographic image, and in a certain sense the segments are related the same way in the image as in the reality. What the brain can do that the camera cannot is to make mental connections between things that are in no discernable way related or connected in reality—as, for example, to abstract the concept of roundness from successive exposures to a tulip bulb, the moon, and a baseball. From its many inputs the brain notes similarities and differences—it generalizes and discriminates and forms concepts.

Furthermore, the brain's images never encompass all details of any given input in the same sense that a photograph does. A brain image consists instead of those particular portions of successive inputs that the organism for some reason, often obscure, happens to have attended to and to have construed as "similar." More specifically, the human system does not respond to the whole of any given input. It responds instead to the similarities of pattern between a given input to the system and the stored internal patterns already organized out of past experience. Similarly, it is the differences in images that are evoked by different inputs that lead to differences in response. And whereas it is relatively easy to trace the correspondences between points in a photographic image and points in the reality it pictures, there is no way one can trace such a relation between a brain's image and an external reality. (No matter how much it is distorted, any isomorphic transformation of "square" must contain four nodes. But there is no "fourness" or "squareness" of neurons, synapses, brain waves, or anything else that represents "square" in the brain.)

The segments of external reality, or at least those parts of it which are not cybernetic systems, are related through various natural laws or principles, such as osmosis or gravity. By contrast, segments of brain images are related in ways that reflect the nature of brain processes, and the ways or degrees to which relations established through brain processes correspond to relations that reflect natural laws is an "iffy" question indeed.

Random Variation and Selective Retention

Brain processes and relationships are initially (and I will not specify whether "initially" means at or before birth) random with respect to external environment. In this context learning can be characterized as the process by which brain patterns that were initially ordered solely with respect to inner forces, and were random relative to outer environment, gradually become ordered relative to environment. Hence I will deal with a general theory about the process by which a random relation is gradually structured into an organized and ordered relation—a theory which, if valid, makes it imperative for educators to attend most seriously to *both* of the two modes of learning. Since the left brain type of function has long received the bulk of educators' attention, this conclusion suggests a significant shift of attention to the role of right brain aspects of learning.

Whether one is dealing with the seemingly uncoordinated motions and observations of the veriest infant or with the most sophisticated scientific theorizing and experimentation, there is (in this view) one process of increasing order. Though as little as ten years ago this way of viewing the problem would have been received coldly in most circles, its range of acceptance is widening rapidly. I apply it here because of my own conviction of both its sensibility and its relevance to education.

This central principle for bringing order and organization out of randomness and unorganization is the essentially Darwinian notion of random variation and selective retention, or RVSR. The chief spokesman for applying that principle to learning is Donald Campbell, an extraordinarily creative psychologist at Northwestern. Using "blind" to avoid certain mathematical implications of "random," an early article of his (Campbell 1962) was entitled, "Blind Variation and Selective Retention in Creative Thought as in Other Knowledge Processes." Because it provides a distinctly different perspective to the problem I take the liberty of adding still another pair of names to the two modes of learning—namely, that right and left brain operations are related, respectively, to the random variation and the selective retention stages of image learning. Furthermore, as one learns more and more images through this process he or she gradually learns something about the process itself, even if quite unconsciously. (Here one might see the recent suggestion of Harris (1975) that all learning is subconscious.) In that situation an individual is engaged in learning about learning, or meta-learning. A natural consequence is to increase the order and decrease the randomness in the "random" half of the operation. A benefit of doing so is that new images can be learned faster than before, but at the probable cost of decreasing the range of imaginativeness and creativity in the new images. The basic principle of RVSR need not be discussed further here, as it has been adequately elsewhere. (See Campbell 1965; A. Kuhn 1974, pp. 435-442; A. Kuhn 1975, pp. 452-464.)

Furthermore, according to this approach, increasing order and complexity are molded by this evolutionary process into a hierarchical structure. Whether for organisms, patterns of thought, or social organizations, little items are joined into bigger ones, which are joined into still bigger ones, and so on. Even when a given unit cannot survive without the larger systems to which it belongs—as with a neuron or a liver—there nevertheless is a sense in which it is also an entity in its own right.

I mention this point here only as a basis for introducing still another pair of names for the dichotomy. That is, I think the important difference is not between (1) a linear or sequential handling of thoughts in the left brain and (2) a simultaneous mingling of them in the right brain, but rather between a hierarchical and a nonhierarchical structuring of them, respectively. (In this connection I recommend Simon 1965.) I was also happy to note that *Zen and the Art of Motorcycle Maintenance* (Pirsig 1974) explicitly supports the view that thinking is hierarchically structured.

The Relationship Between Left and Right Brain Learning

We now move to what I see as the central question—namely, "the complementary relationship between the two modes of learning." Here I would say that it is quite wrong to suggest that the left brain is rational and the right brain irrational—or whatever pair of terms one prefers. The point is rather that rationality is the outgrowth and product of *both* halves of the process. Either half alone is pointless and fruitless; only the combination of the two can produce rationality. Before elaborating, let me note that "rationality" in this context means more than internal logical consistency, as with mathematics or a valid syllogism. It also includes a sensible ends-means relationship, in the sense that it is rational to light the stove, but not to burn down the house, to cook supper, or that a heart but not a liver is a rational means of circulating blood. It is when "rational" is taken to include this kind of relation to an external reality that it can be said that both modes of learning—or better, both steps of the process—are essential to rationality.

Unlike the camera, the right brain can put information together into the kind of freely-associative patterns (images) found in dreams and fantasies, and therein it has the capacity to generate the random variations from which change, and hence learning, is possible. And by having the capacity to test these images against external reality and against one another the left brain discards or modifies unworkable images and retains workable ones. (We could generate a whole book about the meaning of "workable" and "unworkable," since the criteria for "workable" images are by no means as clear as is the survival criterion in biological evolution. But I will refrain, and hope that the basic notion is clear enough for the present purpose.) Without the right brain operation there would be no variation, and hence no change. Without the left brain operation all variations would seem equally good, and hence could bring no net improvement. Described in language applicable to ordinary experiences of ordinary mortals, the right brain does image formation and the left brain does image testing. When scientists do parallel things we call them theory construction and empirical testing.

Having put the left and right brain functions into an evolutionary perspective, it is interesting if we then add the perspective of information theory. Using the information-theory view that order and organization are essentially synonymous with information, Kenneth Boulding once observed that nothing evolves but information. Biological evolution is seen in this context as an information-accumulating process, and RVSR is the only process for accumulating information—"accumulating" in the sense of increasing its order or complexity, as contrasted to simply piling up data. In developing a brain that operates by RV and SR the information-accumulating *process* of evolution has housed in each human being a *mechanism* that can similarly accumulate information from its experience. Thus ontogeny recapitulates phylogeny, not merely in the embryonic sequence of physiological forms, but in the information-accumulating process itself.

Figure 1
SOME ADDITIONAL WAYS OF VIEWING THE DICHOTOMY
Types of Operation

		Right Brain Type	Left Brain Type
Nature of Connections		Random Variation Loose, freely-associative connections. Tentative 1st order conditioning (thoughts → lightning)? Tentative higher-order conditioning.	Selective Retention Hierarchically structured (not linear) connections (as in this diagram).
		[In what sense is either more "holistic" than the other?]	
Names of Processes	Plain	Image (concept) formation, as in play, casual talk, etc.	Image (concept) testing. Perceiving.
	Fancy	Hypothesis (theory) building.	Hypothesis (theory) testing.
		[Re philosophy of science]	
	Intuitive leap	Does fast, unconscious, *intuitive* structuring cross both halves? e.g. —front somersault dive —9 cu. yds concrete	

A Model of the Relationship

For convenience, the main points of this way of viewing the two modes of learning are assembled in Figure 1. The headings of the two columns refer to left and right brain "types" so as to repeat the caution against identifying the two modes explicitly with the two halves of the brain. Under the heading of

Random Variation the upper left cell lists first the loose, freely-associative brain connections that occur in dreams and fantasizing. Anyone who doubts that free associations also occur during perfectly conscious, waking behavior need only listen to the sequence of casual conversation at a party.

Random associations can also arise in the brain by tentative conditioning between two things that just happened to have been associated in overt experience. To take first an example of such association by first order conditioning, suppose I am walking down the street when I observe what is conventionally known as a spectacular blonde job. At the same moment that my thoughts about her take a biological turn a lightning bolt followed (was caused by?) certain unPuritanical thoughts. Here an overt event triggered a mental connection, which must be tested against subsequent observation so that the connection can be extinguished if it is in fact random and reinforced if it is a replicable and regular phenomenon.

In the above example of first order conditioning the connection between lightning and certain kinds of thoughts actually occurred. Second order conditioning is a much more interesting mental phenomenon, because the connection occurs first only in the brain, and it must be ascertained by additional testing whether the brain connection represents a real one. For example, in the laboratory we firmly condition a rat to expect a buzzer shortly after it sees a green light. We next firmly but independently condition it to expect an electric shock shortly after it hears a buzzer. If we then show the rat the green light it will on the very first occasion get off the grid to avoid shock, even though green light and shock have never been connected overtly in its experience.

The rat has done what the philosopher refers to as connecting two terms through a middle term. Green light is followed by buzzer. Buzzer is followed by shock. Ergo, green light is followed by shock. (Who says the rat is not capable of syllogistic logic?) To put it in human terms, the individual through this second-order conditioned experience has formed a hypothesis that green light is followed by shock, and the testing of the hypothesis takes the form of discovering whether the buzzer that reliably follows green light is the same buzzer that reliably precedes shock. Again without regard to where it actually occurs, and whether the initial connection between two things is based on an overt relation or on fantasy, we will think of the initial connection as a right brain function and the testing of it as left brain function. Clearly both are necessary if the individual is to behave rationally in his environment.

The upper right cell of Figure 1 emphasizes that left brain type of activity develops hierarchical, not linear, relations. It is true that green light, buzzer, and shock appear in sequence, and are in that sense linear. For reasons I cannot detail here, it makes more sense in a larger context to think of a larger image, of which green light, buzzer, shock, and time sequence are subimages. I think there is also confusion in which we tend to think of verbal communication as linear because words come in sequence—time sequence in talking and spatial sequence in print. By contrast, I would insist that it is not the sequence of words that matters, but the fact that a number of pieces are put together in a hierarchical pattern *after* all the words are uttered, and pretty much regardless of their sequence. "The cow jumped over the moon" is essentially a single image composed of the combination of four subimages. "Over the moon jumped the cow," or even "The moon over jumped the cow" still convey the same idea once all the words are there. If the last version is ambiguous it is because the syntax embodied in our arbitrary rules of word ordering have been violated, not because the whole is any less a hierarchical combination of its parts. Thus in a position somewhat different from that of Jones I think that to identify the two modes of learning as random variation and selective retention, and as nonhierarchical and hierarchical structuring, leads to more cogent analysis of their complementarity than do many of their other names.

As to the bottom half of Figure 1, I have already suggested that the "plain-named" physical and mental manipulations by which the child forms and tests images (as of solid, liquid, transparency, hole, hard and soft, etc.) are logically the same as the "fancy-named" ones by which the best trained scientists form and test theories. The two-way arrow indicates the continued reciprocal relation between the two modes of learning. An image is tentatively formed. It is tested through experience and experiment. The confirmed parts of it are selectively retained while the disconfirmed parts are modified or discarded. The result is a revised image, which is retested, and so on, till the value of further refinements drops so low or its cost rises so high as not to justify further effort.

The bracketed note "Re Philosophy of Science" in Figure 1 reflects that three different philosophers of science to whom I happened to talk during the past month indicated that they and many of their colleagues could readily accept the above assertion of basic logical identity between the learning processes of children and scientists. They also indicated that such thinking in their field would have been rather rare ten years ago, or even five. Given many philosophers' long insistence that philosophy in no way depends on psychology, it is interesting to observe acceptance of a philosophy of science that is basically Brunerian psychology.

Intuition

Since one of the two modes of learning is often referred to as "intuitive," that term is introduced in the bottom of the diagram. As I use the term here, intuition is the process of joining a number of pieces into a larger pattern or conclusion, quickly and with little or no conscious undertaking of how the parts relate to make the whole. It can occur in complex motor performances. I recall an instance during a swimming session while I was in boot training in the navy. Before being drafted I had done reasonably successful back somersault dives. These are relatively easy, in that the same thrust that lifts you from the board also carries you around, and you can see the water long enough before you land to make last moment corrections. A front somersault is much more complicated, in that the turning motions come after and are quite distinct from the lifting motions, and you don't see the water till it is too late. My few earlier attempts at it had been ungainly and painful. This particular day we did follow-the-leader, and I was in line immediately behind the instructor. After some simpler routines he suddenly did a front somersault. Before I had time to get scared I followed with a reasonably competent and coordinated replica. It did not feel like sheer accident, but rather that my "body knew" very well what it was doing—that it performed the intuitive leap that assembles parts into a coordinated whole, but without knowing how or why. (I have never repeated the performance, as I always subsequently had too much time to get scared.)

Another type of intuition arises from great familiarity with a situation, but again without conscious awareness of the relation of the parts to the whole. To illustrate, a civil engineer laid out the forms for a concrete patio behind his house, measured all dimensions, and carefully computed that it required nine cubic yards of concrete. When the concrete arrived the driver of the truck surveyed the scene thoughtfully for a few seconds and then asked, "Where do you want the extra half yard? That will only take eight-and-a-half." Sure enough, after the forms were filled half a cubic yard was left over.

These examples are important to our topic for the following reason. As indicated by Jones, quoting Ornstein, "many sources" characterize the two modes of learning as the intuitive and the intellectual. My strong suspicion is that the intuitive behaviors illustrated above, particularly that of the truck driver, actually involve both halves of the kind of dichotomy I have described. That is, that kind of intuition involves a subconscious but rapid sequence of image formation, image testing, image revision, etc. The process by which I have reached this "strong suspicion" is itself intuitive. It is a conclusion which I now hold with reasonably strong conviction, but which I could not justify by evidence or reasoning without much more time and thought—after which I might reject it!

Concept Learning

I assume that this audience is interested in developing concepts and images in students—motor concepts that competently direct the performance of motor skills and information concepts about reality that guide their actual behavior. Examples would be the actual ability to breathe easily while swimming, in contrast to being able to describe such breathing, or the actual formation and use of conceptual images in contrast to merely learning words that describe them.

For purposes of this paper I will not pursue the question of the empirical validity of the variation-selection characterization of the two modes of learning. I will concentrate instead on its implications for education *if valid*.

Concept learning is sometimes divided into two species. *Concept formation* is the process by which individuals sort their experiences into conceptual bins of their own making. From their own experiences they form concepts, vague or clear, of such things as shapes, sizes, colors, hard and soft, rough and smooth, fear and joy, etc. At least until children learn language they have little choice but to do this self-initiated formation of concepts. That their distinctions are action-oriented rather than image- or work-oriented does not soften that conclusion. I don't think we need to have much reservation that their formation of these conceptual bins is done only after they have selected from among many essentially random trials of many kinds of sortings of things—even as the ability to identify the distance of an object and the muscle movements required to reach and grasp it efficiently is developed only after selecting *in* the ingredients of the successful random trials and selecting *out* the ingredients of the unsuccessful ones. In parallel, one noted investigator observes that in the early stages of the development of a science "fact-gathering is a far more nearly random activity than the one that subsequent scientific development makes familiar." (T. Kuhn 1970, p. 15) And it is hardly necessary at this point in history to document the fortuitous circumstances (random variation) that led to many important inventions and scientific discoveries, and to note the complementary importance of having present a person with enough sense selectively to retain the significant implications of the accident.

In contrast to concept formation, *concept attainment* is the process by which an individual learns a concept already developed by others. Many experiments have been performed of the sort: "This is a widget; that is a widget; and that over there is not a widget. Now what is a widget?" Though individuals typically gain in efficiency at such tasks (they *form* their own concepts about concept *attainment*), it is clear that the first efforts of novices contain large quotas of random trials.

It is much less obvious, but of great importance to the topic of this conference, that there is also a parallel random half or step in communications by language—though with possible exceptions when we transmit images that are merely new combinations of concepts that are already very familiar to the receiver of the message. To illustrate both the exception and the point, take the sentence: "Jim's well-aimed rock killed the coiled rattlesnake just as it was about to strike his baby sister." If one has seen real instances or movies of poisonous snakes striking from a coiled position; if he is already familiar with rocks and throwing and death and baby sisters; and if he further recognizes that "Jim" implies a male and that throwing a rock implies that Jim is not himself an infant, then the recipient of that message can reproduce in himself a reasonably good image of the situation described. What is more, he can do this quickly and with little or no "experimental" error. But the hearer who lacks such previous experience may make many false trials. If he knows the general meaning of "coil" but not explicitly how a snake coils for striking, on hearing "coil" he might visualize the snake rolled up like a hoop or neatly wrapped around a tree or the baby's leg. Without the requisite prior knowledge "strike" *might* give the correct image. Or it might generate such images as the snake banging with its head or whipping with its tail. In short, the hearer of the sentence might generate any one or more of a dozen different images of the situation by randomly assembling different images of coiling and striking into different combinations. Given enough curiosity he might also seek additional information to learn which image is correct.

Thus, even while acknowledging that a notion of "randomness" free of any constraints at all is presumably nonsensical, one nevertheless can recognize that the attainment of a given concept by one person from hearing a sentence spoken by another will often involve substantial elements of randomness. The amount of randomness is presumably an inverse function of the hearer's familiarity with the subconcepts used in the message. (To avoid complications we will assume that no problems of syntax, noise, diction, etc. are involved.) However, if the concept to be conveyed is very new to the hearer, or is relatively abstract or complex, large random elements may still be present in concept attainment even if all terms in the message are already very familiar to the hearer.

To take another and very immediate illustration, I would take long odds that, although I have taken substantial pains to make this paper a clear communication, all but a few readers (if they do not give up early in frustration) will have to generate a number of different tentative images about what they think I mean. An image generated from one portion of this paper will be tested both against the readers' previous experience (i.e., his extant collection of images) and against other portions of the paper. For any serious reader to whom this whole line of thinking is not already very familiar a tentative image of its meaning based on one part of the paper will probably have to be modified in light of what it says in another part. If we arbitrarily assume the improbable case that the paper is totally free of errors and internal inconsistencies, a reader would tend to assume that he had got my meaning straight when his own image formed from the reading can be checked against every separate part of the paper and be found not inconsistent with it. Even then the reader might still not adopt that image for his own use if he finds other images developed from other sources more satisfactory for his purposes. It is also possible that a reader might attain an image that is not inconsistent with any part of the paper, and yet is very different from the one I intended to convey.

Perhaps it is more likely that the reader will modify some parts of his own images as a result of his attention to some parts of my images than that he will accept or reject the whole of mine, or even that he will really understand the whole of mine. In fact, how could a reader "really understand" the whole of this paper when its author is still struggling to clarify his own ideas about it? How could there *not* be random elements in the recipient's understanding of a message if there are many still left in the sender?

Perhaps the most common of all communicational relations about complex topics is that the recipient of a message modifies some parts of his own images on the basis of some parts of the message without necessarily either really understanding or agreeing with the message itself, or even making modifications in directions proposed in the message. What is more, I think educators would be well advised to consider this situation more the rule than the exception, while recognizing that it probably exemplifies social studies more than it does mathematics or physics. Perhaps our best overall stance is to assume that the function of messages is not to transmit images to students but to destabilize their existing images and stimulate concept formation and concept testing on their own. To suggest that this is a *good* way to teach is hardly novel to good teachers. To suggest that there is no other possible way to teach is, I think, not the usual view.

Teaching

There are large questions about what criteria a teacher or an educational system should apply in determining which images and how many images any given student ought to learn. There are also large questions about the criteria for determining when learning should be by the conventional methods of "transmission" and when by "discovery," which questions are sometimes construed to be parallel, at least in part, to the linear-intellectual vs. the creative-intuitive modes of learning. These are interesting topics, which I someday hope to hear a great deal of discussion about. But they are not part of my present point.

Modes of Learning versus Contexts and Stages of Learning

Thus, as I see it, right brain processes are inescapably involved, and deeply involved, in *any* learning process, and organized images cannot get into the head at all without *both* random variation *and* selective retention. Whereas most readers will readily accept that conclusion with respect to "open school" or "experiential" learning, my point above is that this random step of the learning process is not eliminated even when we use telling, showing, illustrating, or other "straight transmission" of concepts. In general I suspect that concepts which can be transmitted without substantial random elements in the student's learning are not much worth the school's attention.

Hence the question is not whether right brain types of learning should be a significant part of the teaching-learning process, along with the widely accepted legitimacy of left brain types. The question is whether right brain functions should be used offhandedly and ineffectively or consciously and well. Thus restated, the question is self-answered. The question then shifts from "whether" to "how"—a matter to which I will return later. I will, however, through reference to cartoons, indicate two aspects of the problem of selective retention that might otherwise be overlooked.

The first is a Peanuts cartoon that I included in my text (1975, p. 68). It is typical Charlie Brown baseball, with Charlie standing on the mound talking to Lucy. Charlie: "You threw it to the wrong base again!! There were runners on first and second and you threw the ball to first! In a situation like that you always throw to third or to home!" Lucy: "You're destroying my creativity!!" The educational question suggested by the cartoon is: When and for what reasons should we discipline students to accept some *particular* pattern and reject others, and when should we say, "Whatever pattern suits your needs is OK with me"? When should we say the latter even if we believe the former, so as not to kill the spark of creativity? I will raise the questions and let you answer them.

A different cartoon situation raises another question about selective retention. In the movies Bugs Bunny runs off a cliff. He hangs for a while in midair. Then he looks down, does a double take, recognizes his plight, but does not fall

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until he realizes that he is unsupported. Here is a hypothesis about a phenomenon in science—namely, that awareness of being unsupported is a necessary condition for intelligent beings to fall. Whether learners accept or reject this hypothesis depends on what they check it against. If they check it against their own observations in which they jump or fall they will reject the hypothesis. If they check it against animated cartoons they will find it frequently, perhaps unexceptionally, confirmed. Then having got straight that the hypothesis is valid for one context and invalid for another, they learn that an astronaut who steps outside the space ship will not fall *whether or not* he realizes he is unsupported.

Perhaps the ultimate goal of our educational system should be to train students to randomly generate and then selectively retain criteria for determining which contexts are or are not valid for testing particular types of images. Among other things, are we yet prepared to say that the kind of creativity that generates scientific hypotheses is much the same as that for writing poetry, but that the criteria for selective retention are very different? Incidentally, I have stated the RVSR hypothesis to several creative writers, who agreed that it is an excellent description of how they operate. It is also a good description of how this paper was put together. As soon as I learned that I was to talk on this subject I set up a folder. Into it went clippings or notes about nearly everything that *happened* to come across my path of consciousness and that at first blush seemed even remotely related. When I finally got around to preparing the paper some items were selected in, but more were selected out.

To avoid some logical hurdles of "random" let us substitute "chance." It was chance that the February 22, 1975 copy of *Saturday Review* devoted to "Mind and Supermind, Expanding the Limits of Consciousness" was lying on our living room table when I got into this topic. It was by chance that I was able to buy promptly what was apparently the only copy of Ornstein's *The Psychology of Consciousness* (1972) available in any Cincinnati bookstore. It was by chance that I happened to notice the Charlie Brown cartoon while I had this conference in mind—and so on. It is true that some parts of this paper would have been the same if I had not happened upon those items; but it is also true that some parts would have been different.

Selective retention in this case occurred in at least two levels, the first in deciding whether some item was worth dropping into the folder and the second in deciding whether items already in the folder were worth including in the talk. One item went into one part of the paper, was thrown out, was put back under a different heading, and then was thrown out again.

To summarize this point, the two *modes* of learning should be thought of instead as two *stages* or *steps*. Both are essential, and "logic" resides in the interactions of the two, not in either alone. The essentials should not be obscured by a conclusion that "random" is not really random, or that selection is itself multistage. All learning of very much complexity takes place through sequences of image formation and image testing, typically not very ordered, rarely really finished. And except for rather simple kinds of images (as in simple narrative) both halves of the process are inescapably involved, though in different proportion, whether students are supposedly learning by "transmission" or by "discovery."

On the Legitimacy of the Intuitive Mode

Another question posed for this conference was: "How can the intuitive mode be of value, be made legitimate, and become accepted by professions and professionals who have traditionally valued and focused on the analytic, rational mode?" The main answer is implicit in the foregoing discussion. If we recognize that the intuitive mode, at least my particular interpretation of it, is in fact present in any and all learning and there is nothing we can do to stop it, we thereby establish its legitimacy and shift the question to that of making the most effective use of it.

Here some semantic hurdles arise. "Random" and "free association" are "permissive," and to many, that is a dirty word. The dirtiness should be somewhat scoured merely by viewing the permissive stance as a *stage* of learning rather than a whole *mode* of it. Furthermore, random variation can also be appropriately associated with mind wandering and day-dreaming, and even the slowest learner knows that *these* are dirty words when applied to his study habits. Perhaps even more than the professionals, the students must be made to feel that there is nothing illegitimate with mind-wandering *per se*. It can be legitimate, even encouraged, if (1) it is used to explore the possible interpretations of observed phenomena under study and then is systematically checked, or (2) if the student goes on to determine which of his fantasies are realistically possible, and why. Along with conventional measures of the correctness of student answers, in some areas of study perhaps we should reward students for the number and variety of answers they can think up that are at least tentatively plausible, or for devising ways to distinguish the more plausible from the less plausible of their proposals. Students should be made unashamed of daydreaming; their concern should be only if they stop there. If "daydreaming" is too strong a word, at least I want to make sure the essential point is not missed.

In the random variation phase of learning, as in biological evolution, most variations are not viable. That is another way of saying that most of our learning effort, or at least of this phase of it, goes into making mistakes. RVSR is also a fancy name for trial and error, in which the major fraction of trials are errors. This does not mean that they are "wrong" in some deeper scientific or philosophical sense, but merely that they are later discarded. At the level of the scientist, Boulding (1958, p. 96) beautifully captured the sense of it in one of his delightful quatrains:

For all our scientific fuss
Research is still a blunderbuss.
We fire a monstrous charge of shot
And sometimes hit, but mostly not.

Though many teachers, perhaps most, know better, it remains true that many school situations engender in students a fear of making mistakes, which means a fear of entering seriously onto the road to learning. Here, too, we should perhaps attend to another of Boulding's observations that "anything worth doing is worth doing badly." The better known "Nothing ventured, nothing gained" might also be worth keeping in the front of the teacher's and student's consciousness.

Classroom Applications

As to how one implements these things in the classroom I bow to the ten points Jones listed at the end of his paper. I note particularly his third recommendation, about getting to know a helluva lot about some one little thing, and then using it as a metaphor for handling something else that you know nothing about. Better yet, get to know a lot about a number of little things, and try each in turn, or some mixture of them, as a metaphor for the thing you know nothing about. This is one of the best ways I know to generate the variations among which a good one may be found. Relatedly, although scanning devices can inhibit variety if one never goes beyond them, they nevertheless can be useful generators of variation. As an undergraduate social science major I often answered examination questions by grouping the points in each question under the headings of social, economic, political, cultural, and historical factors. In addition to its pragmatic potential for parlaying a little information into an impressive-looking answer, such a scanning device can also facilitate learning. More recently I have often scanned my tyro-level images of electricity, hydraulics, mechanics, biology, neurology, psychology, psychiatry, agriculture, lawn-mowing, or meteorology for analogies to some problem. Even when no Eureka follows, the probability rises that I will better comprehend the problem in its original context. Even the eleven o'clock news about some seemingly unrelated event may trigger an insight. Scan, scan, scan.

Even more loosely, many ideas have come to me during mind-wandering periods of gazing out the window. Mind-wandering *while you also keep some problem simmering in your head* is a critically important open-ended scanning device. But unless you are prepared to let wander through your head a lot of ideas that you sooner or later discard (mostly sooner), you effectively lock out the occasional good one. The principle, I am sure, is as valid for the infant and the student as for the scientist. A problem in teaching is to make the student feel as secure as I do in reporting that he daydreams. An even greater problem: how are teachers to feel secure if they can't make the students stick to what it says in the book or the lecture? In fact, teacher insecurity may be the greatest block to encouraging more right-brain activities by students.

Cross cultural and interdisciplinary studies are also obvious ways of generating variety, if they are so directed. Another is to give students questions for which there is no "right" answer. To illustrate both that kind of question and the role of chance in generating ideas, I was listening to my car radio recently while thinking of this conference, and heard the announcer mention the governor of North Carolina. This reminded me of: Q: "What did the governor of North Carolina say to the governor of South Carolina?" A: "It's a long time between drinks." Using such a random thought the teacher might ask of the students: "Using that question and answer as a starting point, figure out what the lieutenant governor of North Carolina said to the lieutenant governor of South Carolina." And if this randomly generated suggestion of mine should be selectively rejected, perhaps it helps illustrate the point.

Attending to right brain activities in the classroom probably requires great individualization of teaching. It deals with the sequential details of the *processes* of learning, which are different for every student, rather than with the *outcomes* which (if they are "correct" in the conventional sense) are the same for all students. One standard response to this problem is to use the teacher as a resource person instead of as a teacher in the traditional sense, though I cannot say how well that will work. In creative learning it is also sometimes hard to tell the genius from the fool—which leaves some teachers feeling dreadfully insecure. Incidentally, *Zen and the Art of Motorcycle Maintenance* (Pirsig, 1974) contains some good down-to-earth examples of testing one's images about what is wrong with a motorcycle engine. The book also suggests letting the mind wander outside the conventional definition of a problem, in part by just emptying the mind of conventional solutions.

Some Final Thoughts

The above materials are my main message, whose validity I cannot demonstrate but in which at the moment I have strong intuitive confidence. However, before closing I would like to speak my piece about four other items.

First, the fourth question posed for this conference was whether the distinction between right and left brain modes of learning is essentially the same as that between cognitive and affective. The answer from my model of man is a firm "No." Both modes or stages—the RV and the SR—fall within the cognitive. They are steps in learning about what *is*, and are both part of the detector function in the systems mode. The affective deals with what is liked or wanted—that is, with goals or preferences. These are selector functions in the systems model and lie on a different axis. However intermingled and interacting the two may be in the real, living person, the *nature* of the two processes is distinct.

Second is a question which obviously arises when one reads Ornstein (1972)—namely, whether the Zen-yoga-meditation-biofeedback syndrome should be seriously considered in connection with the right-brain phase of learning. (Since Zen and yoga are also essentially meditative, they are hereinafter assumed to be included in that category.) At the moment I think not. The essence of these techniques is that they enable one to control body processes that were traditionally considered subject to autonomic controls alone. I think the experimental evidence is clear that such processes *do* work. I have personally received basic training in Transcendental Meditation, practiced it for some time, and found its use accompanied by a substantial drop in blood pressure—though the experiment, which was designed and conducted through the psychiatry and hypertension departments of a medical school, was muddied in my case by important changes in other factors. I see definite potential for meditative and biofeedback techniques in psychiatry and medicine. They should also help us understand how this incredibly complex human system works. For the moment we can perhaps do no more than speculate about the possible contribution of meditation or biofeedback to education and learning, and the reasons for my present negative predilection are as follows.

Let us start with Ornstein's (1972, p. 195) perceptive distinction between the meditative and biofeedback techniques. Both processes depend on the central nervous system's ability to get "audible" signals back from the biological system. The ability to extract information from those signals depends in turn on the signal-to-noise ratio, which for most of us most of the time is too low to be informative. As Ornstein puts it, meditation raises the signal-to-noise ratio by reducing the noise, while biofeedback does it by raising the signal strength.

Once it receives these signals in usable form the system *can* learn from them. But so far as I have seen, neither meditation nor biofeedback provides any new insights into *how* we learn. By analogy, one obviously cannot learn to identify things by sight or sound if he is blind or deaf, nor can he form images of things that contain visual or auditory components. To remove cataracts or provide a bone-conduction hearing aid to such a person can provide him visual and auditory signals that he did not have before, and hence provide the information base from which he can learn many new things. But providing the signals does not itself give new insights into the process of learning. Similarly, the feedback mechanisms of meditation or biofeedback can inform our systems *whether* we have altered our pulse rate or blood pressure, but apparently leave us in total ignorance as to *how* we do it. Nor does the literature I have seen give any hint that new understandings on this score are likely in the future.

I suppose that there is always the additional question whether it would be useful to have students learn some of these internal controls just for the simple practice of *learning*. In this connection I recall that some years ago at a circus I saw a chap slowly and painstakingly maneuver himself into standing upside down on one finger on top of a straight cane which was standing on its point on top of a hard, very rollable sphere. I was dumbfounded at the practice and skill required for the feat, interested to observe that a human being could do it, and appalled that any real human had actually bothered. Aside from the awe and possible inspiration that sometimes comes from observing consummate skill I see no classroom applications of this feat. That essentially coincides with my feelings about the fantastic accomplishments of expert practitioners of yoga—as with ability to "think" a ten degree temperature differential between two points on the same hand. And despite the repeated characterization of Transcendental Meditation as "The Science of Creative Intelligence"—a characterization that would justify its serious consideration in education if valid—I thus far am totally unconvinced that its practice contributes in the slightest to creativity. In fact a recent article suggests that meditation may inhibit creative conditions in the brain (Martindale 1975, p. 50).

A third point, which may have useful applications in teaching, is discussed by Ornstein under the name of "deautomatization of inputs." By early to middle childhood most of us have formed reasonably stable concepts of most of the common external objects and conditions around us—road, flower, talking, family, or TV. In routine perception the sensory inputs of light, sound, smell, etc. are converted into identifications of these externals, the identifications being based on the activation of images previously learned and stored in the brain. What we normally respond to is the activation of the stored image, and "automatization of inputs" means giving no conscious attention to the sensory inputs themselves. Deautomatization thus means attending again (we must have done so before the concepts were formed) to the actual patterns of the incoming light, sound, odor, etc. To deautomize certain inputs may enable us to extract from them information that we have learned to ignore. This additional information may be useful in itself. Or it may lead us first to destabilize and then to modify our existing concepts in useful ways. One consequence of some psychedelic drugs is apparently to shift attention from the stored images to the sensory inputs. I have no idea whether they also lead to usefully restructured images.

In this connection I recall returning from a meeting at which John Cage sought to justify his use of all manner of sounds in his musical compositions. As I entered my driveway I became aware that my squeaking fan belt, the diesel throb of an Ohio River barge, and the tree crickets together produced a combination of sounds quite different from any of the three taken separately. Without Cage's prompting I would probably not have noticed any one of the three, much less their combined effect. I cannot certify to any useful outcome of that particular auditory experience. I nevertheless think there is educational potential somewhere in occasionally shifting attention from the stored images to the inputs that trigger them. The technique can also be applied where the inputs are verbal rather than sensory.

Fourth and finally, much structured teaching uses some form of analytic dissection that focuses attention on one ingredient at a time, or on two ingredients and their relationships. I am not suggesting that we could or should avoid this, and even random variations may contribute most rapidly to learning if they are oriented around one thing at a time—e.g., all possible methods of keeping grass short. However, there is also a complementary need for attention to the complexity of the particular event. Call this view holistic, idiographic, humanistic, as you like. At a rock concert an individual may simultaneously or in flitting quick succession be aware of the rhythm, the harmony, the melody, the wart on the guitarist's chest, the love life of the singer, the acoustical properties of the sound system, his own need to go to the toilet, the party in Indianapolis where he first heard the song they are playing, three other pieces by the same composer, etc., etc. In a growing leaf there are going on simultaneously the formation of carbohydrates by photosynthesis, evaporation of water from the surface, mitotic division within the cells, osmotic exchanges of water and nutrients, peripheral growth of the body of the leaf, infection of the stem by a fungus, nibbling away of the leafy flesh by two inch-worms, ionic exchanges induced by a nearby electrical storm, etc., etc. Similar holistic views could be taken of an automobile engine, a family, a legislature, a kidney, or a chess game. The student should thereby come to understand that there is no such thing as a "complete" description or understanding of anything, and that we almost necessarily focus on those ingredients (1) that are the most important determinants, (2) of the aspects that affect us most seriously, (3) in light of our existing knowledge and tools for observation. I am not sure how to do this, but am reasonably confident that it ought to be done. I do not know whether left or right brain processes are the more appropriate to enlist in the venture, though I suspect it is the right.

In closing I note that if there is anything innovative in what I have said here it is presumably the product of right brain functioning. If the presentation is in any degree ordered and understandable, that is a product of the left brain. And that is about what we are left with. Right?

DISCUSSION

Knowing and Acting

Nicholas Helburn: I notice in both your presentation and the one Dick Jones gave that the discussion has brought us as far as the thinking and knowing. It has not completed any cycle of translation into action and then further development of the thinking and knowing based on the action. In the most thoughtful models that I have worked with, going from perception to hypothesis to confirmation and finally to action, and then starting the cycle over again, has been the most useful aspect. Would you want to comment on the lack of completion of that cycle?

Kuhn: I can give an answer which is personal for me and is simply an amplification of something that I have been frank to admit several times in recent years to my classes. I say, "I am very sorry, but I have been so busy for the last ten years developing the materials that I am going to try to teach you that I have not been able to give much thought about how to teach them. I have not worked up exercises, problems, etc."

The same comment goes double for this. As regards applying this approach to the teaching process itself—well, it was sort of in the back of my head. But I did not really bring it to the front until I got the announcement of this meeting, and more particularly when I was asked if I would talk.

So, none of my own teaching materials explicitly utilize this kind of thinking, though I hope that in due time they might. Perhaps I can do it next year, when for the first time, I am going to be teaching freshmen—now that I have got out my freshman book (Advert.). That's about all I can say.

How Random is Random?

Ronald Lippitt: I have the impression that your description of scatterbrainedness, as you described it in your own scatterbraining, was really a pretty disciplined process rather than what I would have thought from the earlier description of the randomness of activity. That is, as I heard you describe it, you had a whole series of multiple existing categories called file folders into which you were able to throw almost anything that came along. Maybe not everything, but quite a bit, so that you were working in a pretty organized way in using your scatterbrainedness, and that seems to be a different description of the process of scatterbraining than the random kind of notion.

Kuhn: Well, I think I did preface that by saying that this process is now being described by someone who has been left braining and right braining for years, and with some conscious awareness of what he has been doing. To illustrate it better I would have to go back to the writing of my earlier book—that is, to *The Study of Society*. I then happened to have free almost 15 months in a row, and I spent most of the first year just reading, in a sense, at random. I would just look at something, and if it interested me, I read it. For example, I did not go to psychologists and ask them what I ought to read in psychology. I just pulled out books and looked at them. If something happened to attract my attention, I pursued it.

It was quite random in the sense that I did not consciously know what I was doing or why. It was, as I recall, about ten months before I even had a set of file folders into which to put things. It was all a big mishmash in my head for a long time. And then, eventually, I got some file folders and started dropping things in and separating them. Of course the headings later got changed. And so even though a set of categories eventually emerged, nothing remotely resembling the final set was in my head for a long time.

Intuition: Right Brain or Both?

Arthur Wellesley Foshay: Does the process called intuition, in your mind, refer to the entire process, including the categorization, or is it as I think some people would say, simply becoming awash in the data, wallowing in the information. I suppose it involves the whole process, but I am inviting you to comment on that.

Kuhn: Well, that was close to what I had in mind at the bottom of Figure 1, where I ask, "Does intuitive structuring cross both halves?" I guess (and this is very right-braining again, an intuitive kind of answer on my part) that I would be inclined to say that one can have a lot of random connections which I would not accept as "intuitive." I would not apply the word "intuitive" until that point where you make some kind of a leap into a hypothesis or a fairly clear analogy, at which point you can say: "I think it is something like this."

In saying, "intuitive leap" we sometimes tend to imply that the result is "right." Of course, the intuition can just as often be wrong. In fact, it is more often wrong than right, and I remind you of my earlier quote from Kenneth Boulding: "For all our scientific fuss, research is still a blunderbuss. We fire a monstrous charge of shot and sometimes hit, but mostly not." Again, we ought to keep in mind that just as high a proportion of "error" happens within research and science as in learning in school. Most of the images the scientist and the student start to form in their heads turn out to be wrong. Both should understand and respect that.

Irving Morrissett: The relationships you show in Figure 1 seem very clear and convincing to me, and yet you say philosophers of science would have disagreed with the figure five or ten years ago. What is it that they would have disagreed with?

Kuhn: I do not rightly know. I do not immediately recall that much about what philosophy of science was like ten years ago. But I do remember reading a fair amount of it, and this particular way of saying things did not appear in anything that I read. I do not know: to what extent would you or I have thought of it that way before we read Bruner? Although I think I had some intuitive understanding of this formulation earlier, it took a reading of Bruner to make it explicit enough so that I could lay it out in a diagram, though systems analysis and information theory also helped. I first talked this way in *The Study of Society*, which was published in 1963, and then gradually got increased confidence in it. How did they do it then—the philosophers of science? I do not remember well enough to say.

Right, Wrong, and Maybe

Jack Fraenkel: Why do you use the word "wrong"? That seems to be totally inappropriate.

Kuhn: I should say instead that it is the kind of thing that would be discarded on the basis of further experience. That is all I meant. For the sake of argument I am not even going to presume that the theory that the earth is round is *right* and that the flat-earth theory is *wrong*. I will simply say that the round-earth theory makes a lot of other things easier, whereas a flat-earth hypothesis leaves you with a lot of assorted information which is difficult to handle. But I understand there is still a serious Flat Earth Society.

Lee Anderson: I am reluctant to see you back away from the right-wrong thing. Why can't we say that we are wrong when, in our mind, we associate events that are not associated in the external world or when we fail to associate events that are, in fact, associated? We may not know when we are wrong or right, but, nevertheless, we *are* wrong or right.

Kuhn: I think the question is really that there are very few things that are absolutely and reliably associated in fact. In empirical observation most relationships tend to be probabilistic, and there are exceptions to nearly all of them. So the question is really *how* reliably they are associated, and whether they are associated reliably enough so that we are willing to act upon the observed association. That is about as far as I am willing to go in connection with knowledge.

You may think the sun will certainly come up tomorrow morning. But will it? Suppose it is very cloudy? Will you really be sure the sun is up? All you really know is that it has got lighter.

Suzanne Helburn: Doesn't this get back to the purpose of knowledge, which is action—the question that Nick Helburn raised? When action is based on what you think you know, it is crucial whether you are right or wrong.

Fraenkel: No, it is not. I want to speak to that—to the words right and wrong. When you make that judgment—that certain connections are wrong—you have to be very careful that you do not implant in the learner the thought that they are forever wrong. There goes the possibility of generating creative thought. That is why I do not like the words right and wrong.

Kuhn: All right. Regardless of the ultimates on this, at this point in history and with reference to education it would be well to avoid labeling things right and wrong, but simply to say instead that they check out satisfactorily in some circumstances but not in others.

I have to go a futher step and quote my recent book. (A. Kuhn 1975, pp. 53, 170) There is no such thing as perfectly accurate communication; there is only communication that is good enough for the purpose at hand. There is no such thing as a perfectly accurate concept of external reality; every concept is in some degree false. In either case the only reasonable question is: Is it good enough for the purpose at hand? I do not think you can ever get beyond that, because as soon as you try you get into logical impasses of the sort philosophers debate for decades or centuries and still leave unanswered.

But these difficulties disappear if you deal with it this way: "Is it good enough for the purpose at hand?"

Fraenkel: "Good enough" I feel better about.

Robert Samples: I would like to resolve this, so I will give a good physical scientist's definition of something that is right. Gravity. Gravity is that quality assigned to nature by physical scientists who are trying to avoid neurosis when trying to explain the behavior of falling objects. Now, that is right.

Downgrading of the Metaphoric

Samples (continuing): Something I want to comment on and get your feeling about, Al, is the notion attributed to Einstein that the metaphoric and intuitive is a sacred gift and the rational or linear is a faithful servant. He also commented that this particular society in which we live tends to worship and fund the servant and defy the sacred, and I just wonder if you feel that has any social connotation?

Kuhn: Well, the whole background from which this conference evolves reflects your point. Our society is dedicated to the appropriateness, the teachability, et cetera, of left brain functions, and certainly has downgraded right brain functions. But I am not willing to consider the one as sacred and the other as the servant. I would insist that it is the package. It is the two of them together without which there is nothing. Either alone is useless. And, so, I would rather not label one as better than the other.

As in many other situations, it might help if we think of relatively "pure cases." A person who was all left brain (if such a thing were possible) would be stereotyped, uninteresting, obviously unimaginative, but very predictable. One who was all right brain would be potentially very interesting, but would be

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extremely unpredictable, probably to the point of exasperating everyone around him. In general the former would be easier to live with and be more accepted in a society. Within the usual social contexts the ability selectively to retain sensible things is more acceptable than the ability to cook up a variety of things, most of which are not sensible, without the ability to select among them. Perhaps we can hypothesize that something like this is the explanation for our obvious social preference to date.

To get back to Einstein's observation, let us assume that a given scientist has had enough of both processes to learn the batch of images that he needs for his field. To be a successful innovator beyond the frontiers of science one must have both the right brain ability to generate and the left brain ability to select. But he can remain a competent scientist in good standing if he displays left brain competence alone. Obviously the number of scientists who have the right brain function in addition to the left is smaller than the number who have mainly the left brain function. Perhaps because the combination is scarcer at their advanced level than the one alone, or perhaps because the right brain is unpredictable and hence mysterious, we may call it "sacred."

To return to the context of the schools, in light of past bias, perhaps a sort of reverse discrimination, or affirmative action, in the direction of the intuitive is in order.

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CHAPTER 3

A PERSPECTIVAL VIEW OF CONSCIOUSNESS: AGAINST DUALISM

Maxine Greene

Maxine Greene deals with the many modes of consciousness from a literary and historical perspective, pointing out that our preoccupation with the rational has its roots in the 18th century view of the human condition. Our traditional view of freedom is rooted in the Jeffersonian belief in the liberating potential of rationality.

Greene deals with the many approaches to consciousness and reality with great sympathy and insight. Experience and the interpretations of experiences vary greatly–as viewed from the perspective of the writer, poet, and scientist. But to treat this rich diversity as a reason for choosing sides in a debate about the true nature of reality and the correct relationship of consciousness to reality is an error.

Greene is therefore critical of the "new consciousness," which seeks to reject science and its ways of thought, since there is no inevitable conflict between science and freedom. She regrets that, "for people who 'live beyond the wasteland,' non-cognitive awarenesses may become more significant than intelligence or reflective thought."

Self, Freedom, and Rationality

The idea of the self in this country has traditionally been linked to an 18th century conception of the individual. That conception, developed in rebellion against the divine right of kings, focused upon the fundamental rationality of self-reliant man, upon his perfectibility, and upon his right to liberty. The individual was not described as being inherently free, it must be remembered; he had a *right* to liberty, but that liberty was contingent on many things, including rational capacity. Freedom, according to Jefferson, was the "first-born daughter of science." He meant that only the natural sciences could break the chains of moral and political superstition that had held men captive for so long. He meant that disciplined reasoning in accord with "natural" norms was required if individuals were finally to be free.

This ought to be held in mind as background, I think, when we talk about the self today. Throughout the history of western thought, there has been a stress upon the relationship between rationality (or understanding, or intelligence) and the freedom and dignity of man. The roots of the democratic ethic, and certainly of democratic education, are to be found in the conviction that human beings can become self-determining and effectual if they are given opportunities to question, to communicate, to use their rational capacities. The rise of experimental science in the 19th century strengthened that conviction. For the first time people could envision possibilities of unlimited control over nature; they could see themselves directing the course of evolution, literally becoming masters of their destinies. What was understood to be the methodology of the new sciences appeared to be the method of intelligence in its exemplary form. Those interested, as Jefferson had been, in challenging old authorities and certainties, worked to make scientific thinking central in the schools, to permit the scientific attitude (with all its implications for democratic interchange) to prevail. Minds would be set free that way, they believed; the young would be equipped to cope with socioeconomic change and novelty; humane purposes would be appropriately defined.

In *Individualism Old and New,* John Dewey provided a particularly eloquent articulation of the joy that could be found in the "free working of mind," of the enjoyment nurtured by the scientific attitude. He wrote:

> It is a property of science to find its opportunities in problems, in questions. Since knowing is inquiring, perplexities and difficulties are the meat on which it thrives. The disparities and conflicts that give rise to problems are not something to be dreaded, something to be endured with whatever hardihood one can command; they are things to be grappled with. Each of us experiences these difficulties in the sphere of his personal relations, whether in his more immediate contacts or in the wider associations conventionally called "society." At present, personal frictions are one of the chief causes of suffering. I do not say all suffering would disappear with the incorporation of scientific method into individual disposition; but I do say that it is now immensely increased by our disinclination to treat these frictions as problems to be dealt with intellectually. The distress that comes from being driven in upon ourselves would be largely relieved; it would in part be converted into the enjoyment that attends the free working of mind, if we took them as occasions for the exercise of thought, as problems having an objective direction and outlet. (Dewey 1962, pp. 162-3)

There is something Browningesque—vigorous and impassioned—about the image of self suggested here. We must grant Dewey's antipathy to "being driven in upon ourselves" and his perhaps inordinate faith in the uses of intelligent control. But we cannot deny the expansiveness of his vision. Nothing he said spoke of constraint or limitation or sterility.

Disillusionment with Science

The current challenge to science does not seem to me to be an attack upon what Dewey called "controlled intelligence" nor upon the "free working of mind." Rather, it seems to be a response to a disillusionment, a sense of broken promises. Scientific thinking, in more ebullient days, was linked to a notion of self-determination. Not only was the scientist presented as an autonomous, disinterested, intelligent being; he presumably belonged to the most honorable of communities, where the truth was valued above all things and where knowledge was funded openly, in the full light of day. What was discovered in laboratories was intended primarily to benefit human beings, to heal them, to empower them, to widen the scope of their controls.

Then, suddenly, what was commonly understood as scientific activity seemed to be superseded by technical activity; and the technical outcomes seemed abruptly to take on a life of their own. The outcomes that had the most dramatic impact were those that worked to overwhelm or manipulate or destroy the individual human being, that denied or made meaningless the dignity and worth of man. There were the extermination camps, the brainwashing techniques, the nuclear holocausts, the machineries of torture, the devastation of Vietnam. Not many people, I am sure, read Jacques Ellul; yet, on some level, our lived experience has come to encompass what Ellul describes as an "encirclement" by the same impersonal technique which (given the right circumstances) dominates and kills.

> No technician anywhere would say that he is submitting men, collectively or individually, to technique. The biogeneticist who experiments on the human embryo, or the film director who tries to affect his audience to the greatest degree, makes no claim that he is working on man. The individual is broken into a number of independent fragments, and no two techniques have the same dimensions or depth, nor does any combination of techniques (for example, propaganda plus vocational guidance) correspond to any part of the human being. The result is that every technique can assert its innocence. Where, then, or by whom, is the human individual being attacked? Nowhere and by no one. Such is the reply of technique and technicians. (Ellul 1967, p. 389)

What is fearsome is the reduction of persons to nameless fragments. What is equally fearsome is the technician's separation of his or her own selfhood from whatever enterprise is involved. What is appalling is the lack of responsibility for the consequences of the work being done.

Whether an individual is trying to cope with some official bureaucracy, or arguing with the telephone company, or struggling to unravel the energy crisis, or attempting to find out whether secret files have been kept on his activities, he cannot but feel his self to be in some manner endangered. At once, he cannot but feel that the old promises of efficacy, of personal liberty, have been set aside by people more empirical, more adept, more efficient than he. What is understood to be "science," then, subsumed under technique and game-playing and controls, is felt to be a threat to personhood. The solution, for many individuals, is to go masked, to play roles in the public arena—to keep the self hidden in a private sphere, withdrawn.

Dualism, New and Old

So a new dualism has developed, what Dewey called "a split between the

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inner and the outer" (Dewey 1916, pp. 402-3). This is how I understand the recent upsurge of concern for inwardness and what is popularly termed "expansion of consciousness." Consciousness is taken to be an interior domain, with which one can come in touch through drug experiences, mystical awarenesses, meditation, yoga, even biofeedback. The attraction to interiority is a function of a belief that the self, when conceived as primarily inner and at once akin to spiritual forces in the cosmos, can be thought of as inviolable. Brahman, like Atman, is impervious to physical manipulations and to behavioral controls, even as it escapes empirical formulation and sometimes language itself. B. F. Skinner's denial of the existence of inner states on the grounds that such existence cannot be empirically demonstrated supports the claim that there exists a realm apart from the empirical, or so it is said. The deliberate avoidance of that realm by western experimenters, it is believed, has been testimony to the partial, truncated character of their science, even when that science is celebrated as the "free working of mind."

My intention is to take issue with what I perceive to be an unnecessary and untenable dualism by presenting an alternative vision of human consciousness. Before doing that, however, and for the sake of making clearer what I have in mind, I want to point to certain continuities between the mode of thinking with which we are concerned and with what has been thought of as the adversary tradition in western thought. I mean by that a tradition which originated near the end of the 18th century and which developed alongside, but in tension with, the mainstream of rational and utilitarian thought. It was a tradition composed of a number of overlapping tendencies, ordinarily characterized as romantic, existential, realist, and expressionist. There are many who find a modern version of romanticism in the contemporary revolt against "the value of conforming usefulness" (Gouldner 1970, p. 78), in the unease with regard to proliferating controls. There has been, in other words, a latent critique throughout our history, a tendency of thought which may well have been an expression of another mode of consciousness—be that mode creative, intuitive, imaginative, or simply having to do with "inner space."

The 19th century rebel, like the 20th century dissident, was particularly sensitive to the demand that self and personality both be organized to conform to standards of utility. He was equally sensitive to the increasing preoccupation with control on the part of scientists and to the demand that his thinking conform to the laws, norms, and rational structures that officially defined what was real. It is of particular interest to me that so many of our contemporaries, feeling restive with the analytic or scientific mode, have appropriated the language and the metaphors of the adversary tradition to embody what they feel. Perhaps it is because these have become meaningful in some novel way, perhaps because they seem so appropriately to describe what people are experiencing today. There is a sense, I believe, in which various persons have *learned* to articulate their experiences as they do because of their precursors, the thinkers and artists who preceded them in time.

Consider William Blake's opposition of "reason" to "energy," his critique of authorities and abstractions, his exposure of "mind-forg'd manacles," his call for a fourfold vision that would transcend mere reason and sense (Blake 1961, pp. 15-28, 71-87, 105-22). Think of William Wordsworth in "The Prelude," plunging into his own inner time in response to what he felt to be the "blank confusion" of London, the "oppression under which even highest minds must labour," to recapture his own past and the origins of his creative vision—to reconstitute (through the reconciliation of discordant elements) the composure of his own mind (Wordsworth 1954, pp. 33-132). Think of Ishmael in Herman Melville's *Moby Dick,* warning against the "unseasonable meditativeness" which makes a man lose touch with the reality of his experienced world. Or think of his account of the "whiteness of the whale," which eludes all rational explanation, no matter how meditative the inquirer may be. "To analyse it," says Ishmael, "would seem impossible." He can only give examples, summon up images, evoke feelings of dread and awe. Whiteness, he concludes, "is at once the most meaningful symbol of spiritual things" and yet "the intensifying agent in things the most appalling to mankind" (Melville 1930, p. 282). Logical argument cannot encompass such a contradiction; Ishmael can only try "in some dim, random way" to explain himself. If he does not, he notes, all his chapters "might be naught."

The same tension pervades Dostoyevsky's "Notes from Underground," where the narrator rages, in the name of free will and heightened consciousness, against square roots and complacency and "2+2=4" (Dostoyevsky 1945b, pp. 129-222). A kindred mood can be found in *The Brothers Karamazov,* especially when Ivan, with his "Euclidian earthly mind," talks of his desire for order and meaning in the universe, and of his rebellious desire for justice as well. "I have a longing for life," he says, "and I go on living in spite of logic. Though I may not believe in the order of the universe, yet I love the sticky little leaves as they open in the spring. I love the blue sky. I love some people, whom one loves you know sometimes without knowing why" (Dostoyevsky 1945a, p. 273). Reason and logic are simply not enough. There is a need to reach further, to rebel, if freedom and identity are to be secured.

Now it is clear that Blake and Wordsworth and Melville and Dostoyevsky were not challenging technique as we understand it; nor were they arguing with science *per se*. Peculiarly alive to the human condition, they were taking issue with the predetermined, with legitimations presented as objectively real, with rational structures external to and at odds with what they felt and perceived. And they were doing so from the vantage point of human consciousness, against the background of their own intuitions of what was real. When Ishmael tries in his "dim, random way" to clarify the meaning of "whiteness" for himself, to communicate some understanding of Ahab's manic hunt for the white whale, he can only do so by pursuing what he himself has intuited in his life, by trying to discover what his own experience means. When Ivan speaks of the tension between his Euclidian mind and his refusal of injustice, when he talks about living "in spite of logic," he too is trying to discover his own horizons, to become present to himself, to generate a meaningful world.

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The Limitations of the "New Consciousness"

It is my belief that those who have made a "consciousness revolution" today (often in the idiom of romantic and existential thought) are expressing their own half-buried longings to come in touch with primordial landscapes, with original intuitions of what the inhabited world is like. I believe they are expressing desires to recapture the themes of their lives, to return to themselves and the worlds they have constituted as they have lived. Without always being aware of it, they may be eager to engage in phenomenological inquiry—not to deny rational or empirical thinking, but to rediscover the foundations of such ways of knowing in their own perceptions, their own biographies. (See, for example, Farber 1967, Lauer 1965, and Jonas 1968.)

The new modes of domination, it seems to me, have stirred people into a kind of resentment at being imposed upon by too many official schemata, too much technique; and this has led them to articulate in novel ways the need to emancipate themselves from what they find oppressive in their lives. It is not science or the scientific method, as Dewey and his co-workers understood them, that has caused the malaise. Rather, it is the sense that the self as participant, as inquirer, as creator of meanings, has been obliterated. And this, in turn, has led to a preoccupation with what John C. Lilly (1973, pp. 173-78) calls "self-metaprogramming" or with what Robert Hunter (1971, p. 103) describes as "seismic activity in the intuitive deeps." Much as I understand the need to recover the self, to become conscious of one's consciousness, I am troubled by the suspicion that, for people who live "beyond the wasteland" (see Roszak 1972), non-cognitive awarenesses may become more significant than intelligence or reflective thought. I am troubled as well by the notion that self-awareness is itself curative—and a consequent inattention to social reality and the need for the kind of knowing called *praxis,* oriented to transforming the actualities of the world.

The Nature of Consciousness

Much depends upon how consciousness is conceived—as a container, as pure innerness, or as sheer activity: our mode of grasping, of coming in touch with the world. William James (1950, V.I., pp. 65-67, 145-182, 199-223), Jean-Paul Sartre (1969), Maurice Merleau-Ponty (1967), and Alfred Schutz (1964), each in his distinctive fashion, make the point that consciousness is not to be understood in terms of mental entities. It is not to be identified with acts of pure awareness, *nor* with interiority. Thrusting *towards* the world, towards the situations in which the individual lives his life, consciousness may be understood to be all the activities by means of which objects, events, and other human beings present themselves to the knower. These activities, these acts of consciousness, are multiple and varied. They include perceiving, judging, believing, imagining, intuiting, remembering; it is by means of these activities that persons constitute their worlds.

Now it must be understood that each activity has an object, that consciousness is always *of* something, that it is characterized by intentionality. When Wordsworth—or the speaker in "The Prelude"—returns to the Lake Country where he grew up (having escaped from the vast city where he had been such a "discontented sojourner"), he becomes conscious of the hills and of the cottages in the mode of memory. He remembers "unconscious intercourse with beauty" as a child, as he recalls silver curls of mist and water colored by clouds; he remembers "fits of vulgar joy" which gave way in time to something deeper and more coherent, an imaginatively achieved unity with nature, an understanding that "we half create what we perceive." He is *there*, as a body—the original source of his orientation and perspective; he is physically inhabiting the world. He is striving to come in touch with his earliest tacit subjectivity, when he was first aware of himself, when he had his first precarious grasp upon the world. Only as he learned to articulate, to name, to perceive the wind "shouldering the naked crag," to symbolize "the huge and mighty forms that do not live like living men," to ponder, to make sense, did he begin to constitute his world, to make it meaningful.

Clearly, the speaker in "The Prelude" could not interpret his experience without becoming acquainted with his culture's modes of sense-making, what has been called "the stock of knowledge at hand" (Schutz, 1967, pp. 20-21); but this occurred against the background of his primordial perceptions, against the tacit awareness that rooted him in reality and provided his vantage point as well as the ground for his "focal understanding" (Polanyi 1967, pp. 3-25). This would not happen if he were disembodied, if his consciousness contracted within itself instead of transcending towards the things around. It does transcend; and he, the living poet, can integrate what he remembers, intuits, imagines, feels, believes, and knows. Taking multiple perspectives, he can create a network of relationships; in fact, he can become a network of relationships—as the activities of consciousness intersect with one another, overlap, merge with one another, as he achieves an intended unity with the profiles of his world.

According to this view, states of consciousness can only be understood as objects of consciousness, the termini of real acts of perceiving, judging, knowing, and the like. They are acts undertaken by real persons attending to the realities they encounter from different locations, from different perspectives in the world. Much depends upon the work those persons engage in, since their actual undertakings have much to do with the ways they gear into the world. It is, in fact, through such undertakings that they create themselves. What is given to the speaker in "The Prelude" is in some sense a consequence of his being a poet preoccupied with vision and symbolization. Different aspects of the city and the Lake Country would have been disclosed if he were a peasant or an old soldier or a tradesman or his sister Dorothy; but whatever was disclosed would have been susceptible to viewing against an elemental or perceptual background, the original context of a life. Consciousness always refers to context; consciousness, in some respects, *is* experienced context. And that context, that lived world, becomes the ground of all cognition—the scientist's as well as the poet's. The lived world is the structuring context for knowing, for sense-making of any sort.

Consciousness and the Scientist

The problem where the scientist is concerned is that he loses touch with the ground. He overlooks the fact that scientific experience (be it in biology or psychology or physics) arises out of perceptual experience, in response to significant questions posed by living beings in the light of their perspectival awareness of the natural and intersubjective worlds. Science, it might be said, is a more explicit form of natural perception. It does not refer to a self-contained universe that is independently existent, separated off from human consciousness. Scientific explanations do not possess an objective status, like natural laws. The scientific inquirer can never fully escape the perspectival character of consciousness; he cannot take a godlike, universal view.

"Science is made by men," writes Werner Heisenberg, in his book on the atomic concept. That is "a self-evident fact," he says, ". . . too often forgotten. Science rests on experiments; its results are attained through talks among those who work in it and who consult one another about their interpretation of these experiments. . . . Science is rooted in conversations" (Heisenberg 1971, p. xvii). Bronowski writes that truth in science is an ordering of the facts. "We organize our experience in patterns which, formalized, make the network of scientific laws. . . . We condense the laws around concepts. So science takes its coherence, its intellectual and imaginative strength together, from the concepts at which its laws cross, like knots in a mesh" (Bronowski 1956, p. 67). Michael Polanyi speaks of "independent initiatives" in a "republic of science." He says that these initiatives are self-coordinated, as each scientist chooses a line of the greatest ego-involvement, the line of greatest excitement, "sustaining the most intense attention and effort of thought" (Polanyi 1969, pp. 50-51). I quote these three because I want to emphasize that, from the point of view of the inquirer who is awake to himself and his situation, scientific discoveries must be grounded in experience, in what Polanyi calls "personal knowledge."

John Dewey, always challenging the separation of reflection from experience, would say the same. For him, reflection is not only grounded in experience; its entire purpose is to inform and clarify experience. The *uses* of reason, in fact, are to be found in the contribution it makes to the immediate significance of experience (Dewey 1916, pp. 163-182, 292, 395). The phenonomenologist, of course, supplements this by stressing the significance of the perceptual, pre-predicative background. One writer points beyond even this—to the "elemental background to intuition. It is the depth of the earth, the atmopshere, the luminosity of the light, the muffled depth of sonority" (Lingis 1969, p. 37).

Clearly, it takes critical reflection upon one's own reality and one's own personal history to capture such awareness. It requires a degree of wideawakeness, a degree of presentness that many scientists lack. Working in a domain of external determinations and abstract formulations, they may confuse their schematizations and formalizations with common sense reality. They may overcome the notion of the perspectival with ostensibly final claims. They may act on the assumption that they are describing a unitary, "normal" reality to which all viewers, no matter what their vantage point, must submit. The very fact that they belong to a community of investigators, responding to the same interests and speaking the same language, may keep them from reflecting on their own presuppositions, their own purposes, even the technicizing of what they do. "Normal science," writes Thomas Kuhn, "the activity in which most scientists inevitably spend almost all their time, is predicated on the assumption that the scientific community knows what the world is like. Much of the success of the enterprise derives from the community's willingness to defend that assumption, if necessary at considerable cost" (Kuhn 1970, pp. 42 ff).

This dissociation from background and from consequences, when it occurs, leads to the kind of dogmatism and narrowness that create the problems concerning us now. There is, in actual fact, nothing intrinsic to scientific activity that restricts human minds or requires that they be marked off in squares. Everything depends on the ability to realize that there are diverse activities of consciousness, diverse perspectives to take upon the world, and multiple realities to reveal.

Varieties of Reality and Consciousness

William James spoke of sub-universes of meaning when he dealt with perceptions of reality: the world of sense, the world of science, the world of abstract truths, the world of illusions or "idols of the tribe," the supernatural world, the world of individual opinion, the world of sheer madness or vagary; and he said that "every object we think of gets at last referred to one world or another on this or some similar list" (James 1950, V. II, pp. 279-93). For example, he wrote, "kick the object's warmth and color out. But the world of 'idols of the tribe' stands ready to take them in." Alfred Schutz goes further with this when he treats the matter of multiple realities and sets forth the realities of daily life, of working, of dreams, of fantasies, of scientific theory. "We speak of provinces of meaning," he wrote, "and not sub-universes because it is the meaning of our experiences which constitute reality" (Schutz 1967, p. 730). He went on to say that "we call a certain set of our experiences a finite province of meaning if all of them show a specific cognitive style and area—with respect to this style—not only consistent in themselves but also compatible with one another."

In ordinary everyday life, experiences partake of the same style; we therefore bestow upon them the accent of reality. The reality we inhabit seems perfectly natural, and we take it for granted because those around us talk about it and think about it in approximately the same ways. So it is in the province of theoretical science, where sets of experiences are also bound together by a common cognitive style, one that excludes the subjectivity of the scientist "as a man among his fellow men," his bodily existence, *and* (too frequently) his background consciousness. Here, too, the reality constituted is taken for granted—thought to be as natural, as independently and objectively real as the natural world is thought to be by those working in the arenas of daily life. Ignored, or not recognized, is the fact that the *meaning* of our experiences constitutes reality—our experiences as interpreted, the world as given to consciousness. Ignored as well is the fact that each "accent of reality" is in some manner provisional and contingent, a function of a perspective or set of perspectives, not an acknowledgement of objective reality.

There are, however, what Schutz described as "shock experiences" occurring when we move from one province of meaning to another—and somehow come to realize that the world of work, say, or the world of science, is only one of multiple provinces of meaning accessible to our intentional lives. People move from the waking world to the world of dreams. They go to movies or watch television. They may serve on juries; they may spend time in meditation; they may visit foreign countries and encounter alien "natural" worlds. Each province of meaning is finite; each requires a distinctive shift in attention, a different mode of spontaneity, a particular tension of consciousness. The problem is to enable persons to become aware of what the shocks they experience signify, to become aware of the ways in which they generate meaningful worlds, to become conscious of their consciousness.

Inner Against Outer

I am struck, and somewhat disturbed, by the amount of literature focusing upon what is sometimes called a "postwar consciousness" or "Consciousness III" (Reich 1970), as I am struck by the multiple discussions of how perception has been heightened by contacts with mass media, how consciousness has been expanded by the all-at-onceness of sensory bombardments, by the growing importance of the non-verbal, by immediacies, and so on. Robert Hunter writes:

> When, intuitively, we "sense" something, we are responding in that region of the mind which lies out of reach of the conscious. Cognitively, we must trudge from A to B to C in our search for an evaluation of any given situation. . . . Having long ago chosen the cognitive course, we inevitably brought our thought processes down to the speed limits imposed by such an arrangement. . . . Below the level of cognition, however, the processes of our minds are not hitched to so cumbersome a vehicle as language. They move that much faster. The intuitive regions, unhampered, skip the arithmetic method and proceed with what is, in effect, systems analysis, just now emerging at the cognitive end as the most sophisticated of all approaches. (Hunter 1971, p. 103)

He concludes by asserting that the unconscious is therefore a superior device in terms of velocity and ability to cope with incoming data. I am struck by the related materials stressing the repression of Eros in our world, the debasement of human beings by neutral descriptions and criteria of objective validity. I am impressed by what finds expression in the play *Equus*, for instance, especially when the psychiatrist laments his delivery of Alan from madness and when he talks of himself as someone standing in the dark with a pick in his hand, "striking at heads," destroying passion, thrusting patients into a plastic normality—and feeling the chain bite into his own mouth. (Schaffer 1974, p. 106)

I am responsive to all this, perhaps because I too suffer from feelings of constraint and domination. I too have to struggle for a kind of self-emancipation; I even know what it is to feel a chain in my own mouth. But I believe the response to all this ought not to be the creation of a new either/or, nor an opposing of science to intuition, of social existence to passion, of the outer to the inner. I believe, rather, that we ought to attend to vantage point, to perspective. I believe we ought to communicate to those we teach that they are the ones to constitute their worlds as meaningful as they interpret the situations of their lives, the contexts through which they move, the relationships they have with others. We ought to communicate the fact that somehow human beings are aware of this to the degree that they remain self-reflective and in touch with primordial perceptions, present to themselves and turned outward to the world.

The Pursuit of Self

I take an existentialist approach to the self, in the sense that I believe that we are forever in pursuit of our selves, that it is up to us to invent them, to create them, to choose them in good faith. This is not as far from Jefferson's view as it might appear. Jefferson talked about having the *right* to freedom, and about the fact that freedom had to be achieved through action and thought. And it depended, he said, on the ability to reflect and to be rational. My conceptions of reflection and reality differ from his; but I cannot help identify the emergence of the self with critical reflection. I cannot but identify that emergence with the type of reflection that liberates the person from submergence in reality, from taking the world for granted, and from submission to "official" pictures of what is claimed to be real.

Dewey believed that the self is created through choice of action in the world; and I would agree that reflection is not enough, if the self is to be created and if meaning is to be brought into being. Deliberate attention must be paid to *praxis*, or the kind of knowing that surpasses and transforms, that makes a difference in reality. (See, for example, Sartre 1963, pp. 91-100, and Bernstein 1971.) Selfhood, for me, connects with *praxis*. It connects as well with intersubjective relationships, difficult and even threatening though these may sometimes be. At their most threatening, when one person feels that another is making an object of him or her, making of him or her an "other," looking upon him or her with an "alien gaze," there is still the thrust to self-consciousness, to a refusal of objectification, a rebellion in the name of freedom (Sartre 1969, pp. 337-406). At their most fulfilling, when a person feels another is entering into his or her vivid present, when they are "making music together" suddenly in some dimension of inner time, an intersubjective relationship can enable each person to maintain a distinctive perspective while enabling several persons (in their being together) to act in concert, to feel together, to will together, even to create a community.

Implications for Curriculum

What does all this mean for education, for curriculum? One crucial implication has to do with confrontations with subject matter. I think that the student must be enabled, on whatever stage he finds himself, to encounter curriculum as possibility. I mean by that a series of occasions for him to articulate the themes of existence, and to reflect on those themes until, as Merleau-Ponty says, he is in the world, "which means that things take shape, an immense individual asserts itself. . . ," and what was hitherto obscure is named (Merleau-Ponty 1967, p. 409). I believe that, for this to happen, disciplinary opportunities of many kinds should be provided—the subject matters which represent the schemata used in our tradition to make sense of things. And I think that, as we enable students to order their experiences by means of those schemata, we must also leave them free to look out upon their own landscapes, or what may be thought of as their own perceptual ground.

Journeys to the Lake Country enable some to recover their landscapes in this fashion; music and dancing work for others, or encounters with varied works of art. Paulo Freire used video-taped renderings of daily life and natural settings. Asking his co-investigators (his fellow-learners, who were peasants) to decode them, he enabled them to overcome their silences and, in so doing, articulate the themes of their shared lives (Freire 1970).

The point is that learning must be a process of discovery and recovery in response to worthwhile questions that rise out of conscious life in concrete situations. And learning must be in some manner emancipatory, in the sense that it equips individuals to understand the history of the knowledge structures they are being taught, the paradigms in use in the scientific domain, the relation of all of these to human interests and particular moments of human time. It should be possible as well for people to learn the significance of technique, to understand the dangers of instrumental controls through confrontations with centers of technology, even with bureaucracies. The point is to enable them to pose searching and significant questions with respect to what works upon them and conditions them—and to challenge mystifications, whatever the source.

The learning process, too, should enable persons to reflect upon their own life situations, to speak out in their own voices about the lacks that must be repaired, the possibilities that must be acted upon in the name of what is believed to be decent and humane and just. They should be enabled consciously to interpret and to clarify the meanings of their own experiences, since it is those meanings that constitute their realities. Such meanings can never be imposed, certainly not to the end of obscuring the contingencies without which there can be no situations, nor to the end of making authentic reflection impossible. Dewey wrote that "order is not imposed from without but is made out of the relations of harmonious interactions that energies bear to one another. . ." (Dewey 1934, p. 14). Merleau-Ponty wrote about the possibility of discovering in the unrolling of facts a meaning and at length an orientation that can become reflective and rational, so long as it is held in mind that rational understanding arises out of intuitive and perceptual sources, that the pre-reflective is where it all begins (Merleau-Ponty 1964, p. 52).

The Pursuit of Meaning

With full awareness of the onslaughts on the individual in the technetronic society of our day, I want at last to affirm the joys of living mindfully, of pursuing meanings as we live. Paulo Freire (1970, p. 67) says that education or liberation is cognitive education, and I am convinced that this is so. The narrator at the end of *Invisible Man* asks, in a language that remains meaningful to me: "Why do I write, torturing myself to put it down? Because in spite of myself I've learned some things. . . ." And he talks about how certain ideas keep filing away at his lethargy, and about realizing how important it is to tell other people about them. He talks of denunciation and defending, hating and loving, and about how he must stop hibernating and move upwards into the air, visible at last, refusing invisibility.

> In going underground, I whipped it all except the mind, the *mind*. And the mind that has conceived a plan of living must never lose sight of the chaos against which that pattern was conceived. That goes for societies as well as for individuals. Thus, having tried to give pattern to the chaos which lives within the pattern of our certainties, I must come out, I must emerge. (Ellison 1952, p. 501)

There is almost no more to say. But then, serendipitously, I think of Virginia Woolf, urging women to write fiction in *A Room of One's Own*. She talked of how erratic "reality" is, how it may be found in a dusty road, in a scrap of newspaper in the street, in a daffodil in the sun. She spoke of the stars she saw when walking home and the bus through Piccadilly, and what was left over when the day was over, what was left of past time. "Now the writer, as I think, has the chance to live more than other people in the presence of this reality. It is his business to find it and collect it and communicate it to the rest of us." And we might add, "interpret it." In any case, Virginia Woolf talked about the way such books enabled one to see more intensely afterwards, as if the world were suddenly laid bare of its covering. "So that when I ask you to earn money and have a room of your own, I am asking you to live in the presence of reality, an invigorating life, it would appear, whether one can impart it or not" (Woolf 1957, p. 114). She too was talking about identity and experienced contexts, about confronting the landscapes of a life. And she was saying something that needs communicating somehow to the young.

I think of Shakespeare, Diderot, Rilke, Albert Camus, Doris Lessing, James Dickey, Wallace Stevens, and so many others who knew the darkness and the primordial—who knew as well what it meant to think, to interpret, to confront, to emerge. I choose to end with a poem called "In Due Season," by W. H. Auden, because it touches on some of the things I have been trying to say and settles nothing in the end.

*Springtime, Summer and Fall: days to behold a world
Antecedent to our knowing, where flowers think
Theirs concretely in scent-colors and beasts, the same
Age all over, pursue dumb horizontal lives
On one level of conduct and so cannot be
Secretary to man's plot to become divine.

Lodged in all is a set metronome; thus, in May
Bird-babes still in the egg click to each other *Hatch*!
June-struck cuckoos go off-pitch; when obese July
Turns earth's heating up, unknotting their poisoned ropes,
Vipers move into play; warned by October's nip,
Younger leaves to the old give the releasing draught.

Winter, though, has the right tense for a look indoors
At ourselves, and with First Names, to sit face-to-face,
Time for reading of thoughts, time for the trying-out
Of new metres and new recipes, proper time
To reflect on events noted in warmer months
Till, transmuted, they take part in a human tale.

There, responding to our cry for intelligence,
Nature's mask is relaxed into a mobile grin,
Stones, old shoes, come alive, born sacramental signs,
Nod to us in the First Person of mysteries
They know nothing about, bearing a message from
The invisible sole Source of specific things.

(Auden 1970, pp. 225-26)

DISCUSSION

Hazel Hertzberg: Maxine, you speak of 19th century rebels and 20th century dissidents. I wonder if you were making some sort of distinction?

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Greene: I guess I said rebels, but I meant the romantic rebels. The distinction I think I make is between the philosophers in the 19th century and the people who have appropriated their ideas in some other dimension, in some other idiom, today. I do not find this dissent as much in contemporary fiction, for example, or contemporary poetry, which is interesting.

Literature as a New Superstition?

Jack Nelson: I think you very, very effectively and delightfully, in a couple of sentences, destroyed old religion and superstition. You then very thoughtfully destroyed science as a new superstition, but you left me with the notion that literature is going to be our new superstition.

Greene: I know how it might sound. I need to say I do not think one finds truth in literature. Through an engagement in literature, one finds dimensions of one's own being one could not find otherwise. But I tried to say rock music works for some and dreams for others. I would not want to make it a new superstition or a new religion. You talk out of your own orientations, and literature happens to have been hugely important for me. It was my liberation, and I know I may hammer it too much.

The Dichotomy

Irving Morrissett: In your paper, you made much use of a dichotomous relationship between science, on the one hand, and other ways of viewing the world, on the other. Could you respond to the question Jack Nelson raised earlier: Why a dichotomy? What is sacred about the number two?

Greene: There is a dualism between the things to which we have been attending and the things to which we have not. I think the healthy part of the recent movement has been in turning our attention to something that we have set aside. But I agree with Jack Nelson about the danger of carrying the notion of dualism any further. The thing that appeals to me about phenomenology is the way in which it deals directly with that kind of split in experience and its emphasis on multiplicity, on moving from one kind of reality to another.

If you can substitute "diversity" for "dichotomy," allowing for various realms of experience that we have denied, we can get out of the bind of dualism.

Existentialism and Phenomenology

John Haas: We encounter existentialists at different times in history. One of the things that has always bothered me about existentialism is how it relates—or whether it relates—to social responsibility.

Greene: I have a problem with that, too, in reading both Kierkegaard and the early existentialists. I am sure that that is one of the things that turned me towards phenomenology, and especially phenomenology of the social sciences. It is why I am so interested in Alfred Schutz and interested in doing phenomenology with respect to social reality and to praxis. I know there is nothing revolutionary about Schutz when it comes to social action, but at least it provides a ground, and the existentialists never provided that for me.

A Multiplicity of Realities?

Cleo Cherryholmes: You have used the term reality in at least two and maybe more senses. You talked about reality external to the self and about reality internal to the self. If you are using reality with different meanings, what are those meanings?

Greene: I did use "reality" in a lot of ways.

I do not think there is any way of denying that there exists an external world, a phenomenal world. No phenomenologist denies that. What the phenomenologist does do is to bracket out the question of that independent existence, saying that the only reality for human beings is the experienced context, the interpreted reality. It seems to me very important to distinguish this from the idealisms which deny the existence of an external world. In Merleau-Ponty and Schutz, there is always talk about a world existing out there, but the problem is that the best we can do is see profiles, aspects, depending upon the interpretative approaches we bring to it, or the perceptual apparatus.

Lee Anderson: I am confused. The phenomenology perspective claims that there is only a reality that we experience. I understand that—if, in fact, the level of analysis is the individual. But if the level of analysis is a species, there is an external reality that exists prior to our knowing, is quite independent, and is largely immutable to what we know about it. In the end, it impinges on us, killing us or keeping us alive.

This leads me, then, to a real discomfort I feel about where we go, after we get to the point where we see science as one perspective among many. It obviously does not logically follow that all perspectives are of equal validity, of equal value or merit. That view, at least in the context of the classroom, can very easily reduce all things to politics, where one opinion is as good as another. I think there is something more to it than that, but I do not know how to get from what I consider to be a valid perspective that you have outlined to that additional thing that I want—some kind of criterion by which I can say we are all involved, not only in multiple perspectives, but also involved in a common search, testing the relative validity of our perspectives. God created the world prior to us. There is a reality that disciplines us, and in the end we really do not make the world, or at least not all of it.

Greene: Perceptual awarenesses are characteristics of the species. You, the individual, make sense of your reality by means of the constructs, the schemata, that are provided by a particular culture. You do not spin the world out of your own head. The world you and I see depends to a large extent on our common perspectives and orientations to the world.

As far as the rest is concerned, as far as commitments and norms are concerned, I talked before about living together and creating communities together and developing ideas of what is just and humane. I think that is what has to link us together after all. I cannot think of absolute values or absolute norms, but I can think of people in communities identifying values towards which they will commit themselves and on which they will act.

Alfred Kuhn: I think we must assume an external reality independent of what is inside us, of our images of it. Nevertheless, all of the behavior of any individual is an outcome and reflection solely of what happens to get inside him. There is nothing we can respond to except what gets inside us. You might want to call that the inner reality.

Greene: I do not think we differ. We agree on the existence of an external world, and we agree that we can only know what we know.

The Social Development of Self

Suzanne Helburn: You did not really talk very much about the relation between self and humans as social beings and I was wondering how you would fit Hegel's sort of view of the development and the unfolding of man through time and through alienation, and the solutions that come through self-conscious coping with those problems.

Greene: Refusing the framework of Hegel, I would accept the idea of the importance of the unhappy consciousness, the divided consciousness, and the enormous importance of self-consciousness and understanding—for example, of one's self formation as one relates to other human beings.

I have a feeling—but I have not thought enough about it, and want to think more about it—that the question of how we know other people, how we relate intersubjectively to other people, has an awful lot to do with our awareness, our self-consciousness. We understand others through our sense of ourselves in the situation, in the social world.

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CHAPTER 4

INTUITION AND CURRICULUM

Arthur Wellesley Foshay

Foshay offers the case for a legitimization of the intuitive mode in the course of the usual school offering. Like the other writers, he views intellectual functioning as an integrated whole, acknowledges the historical dominance of the rational mode, and offers conditions to be met if intuition is to take its rightful place. He points to the risks inherent in reducing all learning to skill learning, and by implication is critical of the current educational vogue of reducing all learning to behavioral objectives, since such reductionism runs the skill-learning risk.

As author of the first paper in the second group, the group that seeks to deal with practice directly, Foshay offers concrete illustrations of how intuition might be fostered in school, within the various accepted subject areas. The other papers that follow this one also deal directly with practice.

It will become apparent to the reader that the writers come to the questions of practice from a number of different points. While other papers take a more global view, Foshay deals with practice from the point of view of specific school subject matter.

Alfred Kuhn has suggested that intuition may partake of both right- and left-brain functions—both the metaphoric and the rational. This seems to me to be a very likely hypothesis. I do not feel impelled to explore it, however, since I want to focus on the phenomenon of intuition itself—a phenomenon which I am convinced is an essential element as we consider further educational development.

It's strange that the term intuition should be so threatening, but it is. We associate it with various forms of nonrational or anti-rational behavior: it is not very far from mystic vision, or romanticizing, or dreaming, in its associations. Yet we have the word of many a serious thinker that intuition plays a central part in the achieving of great generalizations.

The Nature of Intuition

Let us try to confront the term. For if it is not very far from mysticism on the one hand, it is not very far from hypothesizing on the other. The dictionary defines intuition as "a quick or ready apprehension." For our purposes, let us define it operationally: an intuition is a tentative or provisional conclusion reached on the basis of evidence either unknown, uncited, incoherent or unorganized, or insufficient. If the evidence is a bit stronger, we call the operation an inference; if it is stronger still, we call it an hypothesis; if it is stronger still, we call it a warranted (or supported) conclusion.

We deal here with the most preliminary part of the act of thought: a kind of adumbration, in which the outlines of a conclusion begin to appear when one sees the first indications of a pattern appearing from the available data. The data may appear as a metaphor, or as an act of fantasy, or in some other "right brain" form. Indeed, the act of intuition seems to partake of what in these papers is often called "right braining." The act of thought associated with intuition is a little like a gestalt, but shadowy, held tentatively; it may well function as a guide to further inquiry, and indeed, in the minds of the prudent, that is precisely what it does. The imprudent settle for intuition.

However, reality forces us to be thus imprudent all the time. Just as Churchill is supposed to have said that most of the important decisions in the world are made by men who do not feel very well, so most of the decisions we make from day to day are based on insufficient evidence. If we can bring some discipline to our intuitions, we will be the better for it. Even more important, if we can learn to accept intuition as not only inevitable, but also necessary and legitimate, we can reduce our self-doubts in some measure, and get on with living.

Intuition in Curriculum Planning

My purpose in these remarks is to examine two aspects of the functioning of intuition in the curriculum: first, in the making of large-scale curriculum decisions, and second, in the arranging of learning activities so that the young may come to trust the process of intuition.

The serious curricularist always makes the given, problematic: inquirers in this field must ask why a given field is offered, or ought to be offered. In the social studies, the answer to the question, "Why?" is almost always that the offering is based on intuition.

For example, civics was offered in the secondary schools for generations because it was supposed to contribute to citizenship. Did anyone ever know this to be so? No, it was an intuition—it seemed to make sense on the face of it. Now the subject has been widely dropped from the offering. Why? Again, intuition. Students found it boring and "merely academic"; they forgot about governmental structures as soon as they had taken the civics examination; they testified that it bore no relationship to their subsequent civic behavior. Intuitions, all of these.

Or take another example. The study of Greek civilization is carried on in the social studies program to this day. Why? Because during the Renaissance it was believed that the Greeks had a vision of life that would enrich the emerging European culture of the time. There was no "objective" evidence to support this intuition, and, in the manner of the history of the curriculum, we continue to honor it by the sheer force of tradition. The curricularist asks that we hold up such ancient intuitions to constant reexamination.

Yet one more example. Geography has a short and turbulent history as a part of the social studies. It began as "place geography" during the nineteenth century, not having been offered previously, and consisted of the study of maps. A typical exercise for students was, "bound Nebraska."

Later, in the elementary school, it turned into a kind of study of regions—"warm lands, cold lands." During my childhood, it concentrated on cute peoples—the various peasants of the world: the cute little Swiss woodcarvers, the cute Dutch farmers in wooden shoes, the cute Mexican peons with their tortillas, the cute Chinese rice paddy peasants with their reverence for ancestors.

None of this prepared me for the reality of the Mexican or Chinese revolutions, the Switzerland of the stable currency and the banking community, or the Holland of World War II.

Incidentally, what we were offered in those days did not then, and does not now, correspond with what the geographers say geography is. The intuitions that led to such an offering (vaguely having to do with orientation in space and the "appreciation" of other cultures) apparently were all mistaken.

We have a better intuition now. If geography is the study of associations of soil, climate, fauna and flora, and location, leading to generalizations about the human use of the surface of the earth, then intuitions, later inferences, and still later hypotheses, are all possible.

Two Hierarchies of Knowledge in the Social Studies

These examples lead me to categorize the types of knowledge we deal with in the social studies. In so doing, I both stay within the field of the curriculum and leave it. The categorization of knowledge is the business, of course, of the epistemologists. But the curricularist cannot avoid it.

For our purposes here, two hierarchies can be discerned: the one proceeds from the fields most nearly based on physical actuality to those based on human behavior, and the other from those based on ideas to those based on manipulative skills.

A current example of the first is an argument I have seen to the effect that as one goes down a hierarchy of disciplines, each level represents a special case of the last. There is progressive enrichment because there is restriction, not expansion, of the range of transformations. For the sciences, the hierarchy has physics at the top, sociology at the bottom. The idea of the hierarchy is stimulating, though the placement of disciplines may be disputed.

Following this approach, one would place the most nearly related field, geography, at the top of the social studies hierarchy, and politics at the bottom, and argue that politics is a special, restricted case of geography, thus arriving at a provocative kind of geographic determinism.

Why bother? Because as one leaves physical reality, the need for intuition increases. The art of politics is full of it. That is, it is full of occasions demanding action without sufficient hard evidence, in which an intuition is all that is available.

The other curriculum hierarchy has to do with the specificity of objectives. The most specific objectives are those detailing hand skills, such as typing, which require no interpretation to be understood. A 15-minute copying exercise, error free at 60 words a minute, used to be the wholly unambiguous requirement for a civil service job as a typist. How would one be equally unambiguous for a civil service job as an historian?

As one moves from the unambiguous hand skills to the fields requiring inference and intuition, the objectives become more and more fuzzy. And the need for intuition increases, ironically, as one deals with more and more fundamental human questions.

The Peculiar Need for Intuition in the Social Studies

The key to our curriculum problem seems to lie here. As the questions deal more with human behavior—with the human condition—they require more of inference and interpretation, and therefore intuition. The argument for attending as directly as possible to the problems of intuition stems from this situation. Let us try to do so here.

I shall attempt now to offer illustrations of how intuition might be fostered in the curriculum, assuming we wish to do so. In making the attempt, I am aware that we tread new ground. While we recognize the place of intuition in the arts, we have been enjoined from doing so in other fields by our tradition of rationalism.

There is no place for intuition in Bloom's *Taxonomy of Educational Objectives: Cognitive Domain*, and we therefore have tended to rule it out. I hope the earlier argument makes it evident that in so doing, we have misled ourselves. It is precisely such ruling out that draws us in the direction of Mr. Gradgrind, who wanted only facts, and away from the more liberal educational tradition beginning with Rousseau.

The rationalist tradition, if one is to agree with Crane Brinton (1963, Chap. 7), ignores one half of the history of modern thought—that half that includes Rousseau's General Will, Cardinal Newman's Illitive Sense, Pavlov's Conditioned Response, and the insights of Freud.

All of these ideas, which have a shaping effect on contemporary versions of what it is to be an intellectual, are closer to being intuitions than they are to being scientific generalizations. Our intellectualistic pedagogical tradition ignores them all. We ought to do so no longer.

In order to deal with curriculum designs that would foster and legitimize intuition, it is necessary to return to the task of definition, this time in more nearly behavioral terms.

Conditions for Intuition

Most of us have experienced intuitions. We know an intuition has taken place when we "suddenly apprehend," as the dictionary says; that is, the well-known

"Aha!" experience can be considered an announcement that an intuition has taken place.

What are the conditions that foster such intuitive experience? I can discern two, though there may well be others. One is that all of the data be internalized, so that the data function like a saturated solution. Shake such a solution, and crystals form. An intuition can, so to speak, crystallize out of a set of data, provided one has saturated one's self in the data.

I well remember the long evening I spent while I was a student, trying to make something out of Matthew Arnold's lyric poems. I had read the poems over and over, and I greatly admired them, but I had nothing to say in response to them. However, a paper was due the next day.

The time for wallowing in the poems had ended. I obtained a typewriter and some supplies, went to my father's office about 8:30 p.m., and sat down to write. There was still nothing.

Once more, I went over the poems. By now it was after 11:00, and I was getting sleepy, so I went out to drink some coffee and eat a hamburger and cheese sandwich, those surefire keeper-uppers. When I returned to the typewriter, the poems suddenly fell into place as facets of Arnold's view of the ideal man, which, I thought, was basically Greek. All I had to do was write it out, which I completed by about 5:00 a.m.

Notice the conditions: saturation, a deadline, a long period of lonely concentration. If this illustration serves, one may say that intuition is an inward, not a social, affair. The experience is private, though the announcement may be public.

Consider another illustration, supplied by a student: a second grade teacher found that the children did not understand the concept, one-half. To them, half of something was simply a piece of it, and one could have as many halves as there were pieces.

What the teacher did was to provide a number of sets of pieces, some in eight parts, some in seven, some in six, and so on. She picked up one of the pieces from its set, and said, "This is called an eighth." Putting it back in place, she counted the eight parts, and announced, "See, there are eight." She repeated the same process with a seventh, a sixth, a fifth, and so on. When she came to the halves, one of the children said, "Oh, I know. It's a twoth." An insight, or an intuition, given all the data and a kind of saturation in the data.

If saturation in the data and an occasion for putting the data together are one condition, another is that the data, though incomplete, assume a shape from which a whole can be inferred. There is very little to inference in instruction as we usually carry it on, but two examples occur to me.

During the day of the Progressive Education Association Workshops, one of the problems typically addressed was the danger of stereotyping children. An exercise was devised to drive this point home. Successive bits of information were given about a hypothetical child until a stereotype was formed. Then a final bit of information was given that shattered the stereotype. Here is an example: "This little girl is nine years old. She has a baby brother, whom she adores. She has recently made clothing for all her dolls. She does well in school. She says that she would like to be a teacher and a mother when she grows up. She is epileptic and shows signs of cerebral palsy." After each sentence the teacher is asked a question such as, "Would she be one of your favorite children in your class?"

What is called for in such an exercise is a leap of the imagination—an intuition. Perhaps, if we used such exercises commonly, children would come to an understanding of the place of intuition in thinking.

Here is one more example, this one real. I observed a class of third graders in Orinda, California, working through a lesson from the then experimental Science Curriculum Improvement Study. The lesson dealt with relative motion, and involved reporting on how "Mr. O," who could only declare where things are in relation to where he was, would report something in front of him, behind him, to his right, beneath him, and so on.

At a certain point, he was to report on where a fixed object was when he, Mr. O, was moving. He would, of course, report that the object was moving. This part of the demonstration became more complex—when Mr. O moved up and down, he reported that the class was moving up and down, or jumping. When Mr. O was revolved forward, he reported that the class was going over his head. At this point, one of the girls in the class said, with excitement, "Now I know why the sun rises and sets!" She had made the leap.

Putting Intuition into the Curriculum

In bringing this type of thinking into the curriculum, then, we have to meet at least these two conditions: a saturation with data coupled with an occasion for its interpretation, or a presentation of an organization of data that invites a leap of some kind. Let us try to imagine curriculum situations in which these conditions might be met. We shall have to imagine them, for the actual occasions when intuition is encouraged are, as things stand now, very rare.

There are seven fields offered in the elementary school: reading, writing, mathematics, history, geography, science, and the arts. Some would group these into broader fields: the language arts, the social studies, science, and math. For our purposes here, however, it is easier if we treat the various fields of learning and activity in their more discrete forms.

Reading

Aside from decoding, this presents its own technical problems and opportunities for gestalts as reading phrasewise begins to appear. In addition, there is the whole field of interpretation of literature to be considered.

Here, encouraging intuition about a given literary work or passage would seem to consist of asking questions, or soliciting questions, that require some kind of leap. Alan Purves has strongly implied a number of such questions in his analysis of students' responses to literature (Purves 1963).

There are four large classes of response, according to Purves: *Engagement:* How does the work "grab" you? What does it leave you saying about yourself as one involved in this particular literary encounter? *Perception:* What is going on in the work or in the passage? What is its tone, its mood, its technical makeup, such as style, plot, and characterization? *Interpretation:* What does the work mean? Are there hidden meanings? How may it be interpreted morally, psychologically, politically, sociologically, etc.? *Evaluation:* How well was the work done, considered from several points of view—technically, morally, socially, mimetically, and so on?

Since most literature does not seek to answer these questions directly, and since they are, indeed, important questions about one's response to literature, a significant leap, or intuition, later to be supported through citation of the literature itself, is required.

This approach to literature has characterized the better college classes in literature for a long time. What I propose here is that it also characterize the approach to literature all the way through school, with modifications of the questions to fit the students' life experience and maturity. The better college teachers have asked examination questions of the type, "It is often said that Wordsworth is a sort of pantheist. Discuss this comment, indicating what in the poetry supports the comment, and what denies it. If Wordsworth was no pantheist, how would you characterize his work?"

At the sixth grade level, one might substitute Robert W. Service for Wordsworth, but the question would be equally searching: "Now that you have read several of Mr. Service's poems, tell me how he thought people ought to live."

Writing

It is in writing something original, especially, that the opportunity for leaps is presented. The essay form itself calls for intuition as a condition to be met on the way to a leading idea around which an essay can be formed. Unfortunately, the writing of essays is now usually delayed until fairly late in secondary education. It need not be; children can be asked to develop an idea and state it coherently, perhaps first orally, then in writing.

The writing of stories, plays, poems, signs—all meet the conditions for intuition we have stressed here. Unfortunately, most teachers at the elementary level are so preoccupied with the mechanics—capitalization, spelling, punctuation—that they consider such original writing as a kind of dessert. Such writing ought obviously to occupy a central place in the curriculum.

Mathematics

The great tradition of schooling is that we shall teach what is certainly true. The reduction, or the removal, of uncertainty is the great opponent of the use of intuition. Nowhere is this unfortunate situation more obvious than in the teaching of mathematics as it was taught universally until 1955. With the backlash against new math, we seem bent on reasserting the tradition, bringing to an end the kind of conceptually oriented problem solving we have dallied with during the past 20 years. Too bad.

In the new math, we had the opportunity to introduce intuition into the bastion of the true and the fixed—and the dull. Even in these "back to basics" times, however, all need not be lost. If we will but deal with number systems as human achievements rather than as revealed truth, we can open the possibilities. A former student of mine told me that the concept of negative numbers "blew her mind." I asked her how the teacher had handled it, but she did not remember. What she remembered was, not surprisingly, the flash of insight.

The discovery of concepts would appear to be at the root of our purpose of making intuition conscious and legitimate. In mathematics, when Nathen Lazar of Ohio State years ago introduced his "abacounter" which is a combination of abacus and counters, students not only discovered some of the properties of the number system in its most elementary form, they also discovered ratio and proportion, and that one could base the number system on a number other than our "ten." During the thirties, when Harold Fawcett of the same institution developed a course called "The Nature of Proof" in place of tenth grade geometry, he was going in the same direction.

History

For an audience of people in the social studies, I scarcely need dwell on the intuitive possibilities in history. If children will learn that history is not a study of the past, but of the records, always incomplete, that remain from the past in the present, then they can begin to learn to think like historians, which is to say they will have to begin to find consistencies in the records by intuition, later verified.

Erling Hunt had a favorite illustration, based on a seventh grade class in Long Island, of children beginning to learn how historians do their work. The illustration has the great advantage of leaving the children with not a "yes" or "no" answer to their quest, but a "maybe." The work consisted of seeking the answer to the question, "Did the Pilgrims actually step ashore on Plymouth Rock?"

The quest led the students back through the various tellings of this story, until it ended in the memoirs of a 90-year-old man, telling of his childhood. Is the Plymouth Rock story true? It depends on how much credence one puts in the old man's memory. The conditions for an intuition are met. Children might intuit how story becomes legend from having saturated themselves in this account.

The general question that requires intuition in the case of history is the same one that is the beginning of literary scholarship: "How can this be?" "How could we have become embroiled in World War I? Korea? Vietnam?" "How was it that Shay's Rebellion took place?" "How could the panics of 1870, 1893, 1907, and 1929 have happened?" And so on and on. The great invitation to intuitive thought is the question, "Why?"

Geography

Geography as we have known it in the past bears little relation to what geographers do. Map making and map reading are only studies of the systems of notation of the field. Geographers study associations of considerable complexity. When a seventh grade class at Oneonta, under the tutelage of Robert Arnold, studied the gazettes showing the sale of crops at ten-year intervals during the nineteenth century in Upper New York State, they found the sale of wheat dropped sharply at mid-century. Why? Why did the land use change so abruptly? Because of the introduction of another kind of geographical phenomenon, the railroad, which opened the vast middle west as a source of wheat.

Putting these facts together required imaginative leaps by the students. The associations geography students study do not interpret themselves; they require constant reinquiry, constant leaps as patterns of association are discovered.

Science

The usual illustrations of intuitive thought come from accounts of scientific discoveries. We have all heard of scientific discoveries. We have all heard of Newton and the apple, of the discovery of penicillin, and other serendipitous occasions, even though the tradition of scientific inquiry seems to contradict the intuitive.

It is the argument here that intuition is not erroneous superstition, not wild myth, not ancient beliefs preserved in Jungian amber, but a necessary first step in the process of inquiry. As such, the opportunities in science instruction are almost boundless.

When I taught old-fashioned general science in a junior high school a generation ago, I early found that the best way to grasp the students by their minds was to present unsolved problems for them to "figure out." I demonstrated convection currents, and let them invent the concept. ! demonstrated air pressure, separated white light into its constituent colors, and so on, always offering the phenomenon as a puzzle to be solved. Again and again, some student would make the leap.

This cannot have been an unusual practice. Therefore, when in the Science Curriculum Improvement Study, I observed little children discover the concept, "solution," I was not surprised at anything but the age at which the problem was offered. When I observed the third grade girl leap from relative motion to the rising and setting of the sun, I thought, not that she had made an application, but that she had made an intuitive leap. Intuitive, because she had to detect the shape of the idea. It was the shape she announced with her surprised comment.

The Arts

Of all the fields widely offered to students, the arts provide the most frequent invitation to intuition. This arises, perhaps, from the bald fact that each of the arts has its own language, which requires some kind of translation, and the making of an art object always involves some kind of transformation.

One may say of the artist that he transforms whatever stimulus from reality he is dealing with into a kind of quintessential statement of his own. The leap we have been referring to is always present in the arts. It is also involved in the decision made by the participant-observer to have an aesthetic encounter, rather than a rationalistic encounter, with an object.

For our purposes here, we may regard the artist, in whatever field, as a maker—a maker of an intuition into a statement in one of the art forms. One thinks of *King Lear,* for example, as a quintessential statement of the tragic view of the human condition, or of Picasso's *Guernica* as an ultimate statement of panic, or of the *Mass in B Minor* as a compelling statement of the sublime.

Similarly, when children make art objects they reify their intuitions. Paintings are prefigured, or adumbrated. In the process of making the painting, whether the painter is a naive child or a professional artist, the prefiguring is both altered and filled in. The thought process involved in the making defies description in rationalist terms. The artist proceeds through a series of intuitive leaps, some of them so dramatic that they are called flashes of intuition, or flashes of insight.

It is because of the distinctiveness of the experience of making a statement in the arts that the field is attacked so frequently when a budgetary crunch occurs, and defended so passionately by those who have had such encounters.

I do not wish to characterize the arts as pure intuition. Skill and thoughtful planning are of course involved. What I mean to stress here is that intuitive behavior is constantly invited in the encounter with the arts, and that unlike other fields commonly offered,intuition is generally acknowledged to be legitimate. That is why those who are afraid of intuition are afraid of the arts. In this country, particularly, with its strong Puritan tradition, intuitive behavior, and therefore encounters with serious art, are widely distrusted, though one can be grateful that this attitude is changing.

Well, we have marched through several subject fields, looking at the possibilities for intuitive behavior in each. Such possibilities have been relatively easy to find, provided one takes a field, not as a set of established findings to be "learned"—that is, memorized and applied—but as an array of problems.

Ruleg and Egrule

In general, intuition is solicited when one makes the given, problematic. One of the interesting questions in studies of human learning is whether new information should be presented first as a rule and then by example—ruleg—or first as examples, then the rule or principle—egrule. Ruleg appears to be a bit faster, egrule a bit deeper. Why deeper? Because the opportunity for intuitive leaps is greater when one seeks to induce form—a rule or principle or generalization—from that which is unformed.

This does not imply that there is no intuition involved in making the leap from a principle to its application—from rule to e.g.; indeed, since some applications of principles are far-fetched, one may say that the leap can go a considerable distance. But the difference between applying a given form to unstructured reality, and interpreting unstructured reality into a form, would seem to imply basically different kinds of intuitive behavior.

The strategy developed in the new curriculum projects, those developed since the fifties, appears to be inductive—egrule—in character. It has seemed to the curriculum developers to more nearly correspond to the way each of the fields actually functions when one conducts inquiry in it, when one learns how to think like a scholar.

Intuition and Basic Skills

It develops, then, that we are already well on our way to conceiving school subjects in such a way as to encourage intuition. If we can continue this process to cover more of the subjects we offer, we will have encouraged intuitive thinking on a broad scale. What stands in our way is the notion of skill development. There is a whole array of skills we must offer—spelling, decoding English and foreign languages, and vocational skills such as typing and drafting. Our tradition has been to offer only a drill strategy for teaching them.

Drill, essential as it is, is the least intuitive form of behavior. I have noticed that in Europe they do not make drill their only strategy. In the polytechnic schools in Poland, for example, students are given basic courses in electronics as a condition for learning to be electronic technicians. In this country, even the simplest aspects of medical technology require knowledge of some components of basic theory. It is only in the schools and in large-scale manufacturing that people are taught know-how in the absence of know-why.

Applied to schooling, the introduction of intuitive thinking into what we now see as skill subjects would lead us to teach some aspects of the history of English language when we teach spelling, to the end that students come to a realization of English as encapsulated history. Students would not merely learn to operate computers; they would reinvent them, beginning with Hollerith cards. They would learn, as they do in some European schools, the basic physics behind the operation of metal working tools. They would learn some French philology as they learn to read French. And so on. In every case, we would ask our students to learn in what sense the given skill is (or was) problematic.

Core Curriculum Revisited

There remains one other aspect of the design of the curriculum to be considered: that which transcends discrete subjects. Social studies is almost the last of the "broad fields" curricula to have survived the demise of progressive education. With its combination of basic social sciences, it invites the kind of bridging generalization that requires an intuitive leap.

The social studies people, historically, tried to accomplish such leaps by seeking to deal with real-world problems, knowing that such problems transcend and combine the basic social sciences. Transportation, or crime, or housing, or health—all of these and the other problem areas like them are interdisciplinary in character. In the old days, a generation ago, these were the kinds of themes studied under the rubric, "core curriculum." The core curriculum, so named, is found only in a few schools now, though some of the elements of core have become commonplace under other means.

With respect to the larger aspects of curriculum design, I propose that we reexamine the core movement and attempt to continue its development without repeating its mistakes. The principal weakness of core as it used to exist was that the treatment of these great social problem areas was often superficial, and sometimes mistaken in concept. To avoid this kind of problem, we need well-developed curricular materials and plans that ask the kinds of questions that lead to intuition, while providing the data (remember the point about "saturation") needed to provoke the intuitive leap, and at the same time offering the criteria according to which the generalizations made about these great sweeping themes may be evaluated for their sufficiency, their applicability, and the degree in which they take account of the data.

This is a new-old proposal. What is old about it I have reminded you of by calling it by its old name, core. What is new about it is the introduction of a kind of discipline that was missing during the thirties and forties, when core was in the ascendant.

A somewhat similar move can be made in other broad fields—the arts and humanities, the sciences and math, the career fields. Since those in the social studies have the longest experience with the problem, perhaps they should take the lead.

In Summary

In these remarks, I have offered certain proposals and notions about intuition and its relation to curriculum design. What they come down to is this.

1. Intuition is like insight, or an imaginative leap, and is a necessary first step in the process of thinking.
2. There are two (perhaps more) requirements if intuition is to take place: one must become saturated with the data, and an occasion for putting the data together must be offered.
3. There are opportunities for intuition in all the standard academic subjects, provided they are taken as modes of inquiry.
4. The old broad fields movement needs to be revived and rejuvenated.

DISCUSSION

Intuition First or Last?

Jack Nelson: It seemed to me that you used what you called intuition, the leap, meaning a last step, as if it were a first step. Is it only a first step, or can it also be a last step or a middle step?

Foshay: It could occur at various points along the route. I think it is necessary to think of it as the first step, since what you are presented with is Professor Kuhn's "scatterbrainedness." You have a lot of unorganized material and you want to impose some kind of form upon it. This disposition to develop a form out of random data is what I am calling a first step, an intuitive first step, a trial.

Nelson: The problem I find, I guess, is in the linguistic hierarchy, which is presumed when one talks about first step. A "first step" implied that somewhere along the line you are going to do something that is better, grander, more complete, comprehensive, or whatever. It seems to me that some of the examples of intuition that you used and some that I can think of are kind of nurtured inside, and may be the last step, and the most important one.

Foshay: I think this could be a quibble. Have you seen Picasso's drawings of *Guernica*—a set of perhaps 20? He worked over the major themes of the painting again and again and again. Every one of them, every drawing, I suspect was preceded by a kind of intuitive flash. If I remember correctly, the horse became a bull and some of the people appeared and disappeared from the painting as it evolved on his drawing borad. One could say that in the carrying out of the 20 preliminary drawings, he was saturating himself with the painting, and finally that he made the leap and completed the painting. That would fit my formulation. Or you could say, as I prefer to, that he begins with an intuition about a painting and sketches it and then revises that again and again and again.

The difference is not a very important one. I think it is a quibble.

Intuition and Insight

Gerald Marker: I would like to go back to the intuitive insight, to those two terms that you used. You characterized the "Aha" experience as an insight, which seems to me is the immediate dawning on the person of how things fit together. That seems to me to be different from an intuition. With intuition, you do not quite know why you feel a certain way or think you know something. If pressed for a reason, you often say, "Gee, I do not know." The two seem to me to be quite different, and yet you have used them almost interchangeably in your remarks.

Foshay: I think one is almost a case of the other. Again, this may not be worth pursuing; this kind of distinction may not make a difference. The "Aha," it seems to me, is more or less an announcement that something has happened. It may be an announcement to one's self or to somebody else. I prefer to think of it as an intuition, a flash of intuition. My impression is—I say this with some doubts—that intuitions, certainly in my own experience of them, have always been a sort of sudden falling together of stuff. It may be dramatically sudden and you say, "Aha!" or it may be, as in the case of my term paper, something that lasted several hours. But, you still have the feeling of drama, of suddenness. One tends to remember these dramatic incidents.

The Anatomy of Intuition

Peter Dow: I would like to pursue a little bit the question about intuition. It strikes me that what you did not say much about was the writing of the term paper; that is to say, the intuition was the first step, but then there is the active communication, the transmission of the insight. How do you relate those two?

Foshay: Well, in this instance—and I have read accounts of this experience among major writers and composers—in this instance, I had a very strong feeling of simply writing it out. It was all there. Anybody who could type could have written it. I had the feeling that I was just doing a clerical task at that point.

Maxine Greene: I was thinking along those lines. I was remembering a little essay written by Matisse on how a painting comes to be. He was interested in the way the intuition gets embodied, and he found all kinds of clues in the medium itself, as he kept working. Do you feel—isn't it possible that intuition works like that, too, somehow in response to the very development of the language or the medium?

Foshay: You remind me of found art, and then I go from there to the kind of aesthetic decision one makes with respect to something found. You decide to look at it aesthetically. Is that intuition? I think it is clearer if you call it a decision—

Greene: I agree with that.

Foshay: —an aesthetic decision. If you are an artist, you now mount it so that other people will have the same kind of encounter with it, and they think that you have seen the thing intuitively in this frame and in this mounting.

Greene: As somebody said before, I do not know what I think until I start writing, and that is why I think so much about the place—the whole shaping process—of the raw material.

Testing the Results of Intuition

Stanley Wronski: I have some concern about Wells Foshay's application of an intuitive approach without a recognition of its inherent philosophical limitations. I think you would readily agree that if a student came to the conclusion, after the U. S. Government announced a rationing of sugar, that the intuitive thing to do is to go out and buy sugar and stock up, for the general good, this would not be a desirable kind of action for everybody to pursue. And I am wondering if there aren't other kinds of socially significant actions which, if they were pursued on an intuitive approach, might be counterproductive, or antisocial.

I mention this because even though I have been tremendously impressed by the extent to which something other than a cognitive approach can be useful in a social studies program, I do have some reservations about exceeding its philosophical load limit. I am impressed by the fact that whenever you or many of the other speakers were asked to give examples, frequently the kinds of examples that were given were a painting, or some such kind of personal self awareness or personal consciousness, all of which are good, but which may have limited applicability to the real social world and to the real social and economic and political problems. I want to raise a flag of warning or concern lest we exceed the philosophical load limit of intuition and other kinds of approaches to knowing.

Foshay: I would like to respond to that. I think that it is helpful—and I do not know any other way to put it—I think it is helpful to recognize this kind of behavior that is in all of us as simply a fact; not as a moral fact, simply a fact. It is no more moral or immoral than a thousand other things we do, including dreaming, for example, which we have discussed. One *then* subjects it to various tests, moral tests. For example, I do not doubt Hitler had intuitions about Jews. There was no check on him, so the intuition led to a ghastly crime.

I do not doubt that there are intuitions among other criminals in the world. So I would separate the process of testing, putting limits and so on, from the act itself, and consider the act, in many cases, as a risky matter.

Patricia Johnson: How do you evaluate intuition, and where does the evaluation fit into the classroom?

Foshay: I have not thought this through. I have thought about it essentially in terms of research strategies, in which one begins with some sort of intuition which leads to some kind of hypothesis which you eventually test according to a well-known set of conventions.

I wonder if there isn't an equivalently well-known set of conventions that could be applied in the classroom. For example, does the intuition take into account all the data it needs to take into account, or does it need further work, or is it sufficient unto itself? Can it be tested? Can it be verified? Can it be made public and verified through public examination? These are the kinds of criteria that occur to me. They were not carried out well enough in the old days of core curriculum, which is why I was critical of it, and so some sloppy work slipped through because it was not tested or examined critically.

The Literature of Intuition

Michael Wertheimer: I have heard many different terms. We were told not to make up new dichotomies, but the term "intuition" has, I think, been used in your presentation in ways that can be considered close to synonymous with the terms "insight," "productive thinking," "discovery," or "inquiry." It has some of the elements of all of these; and there is, of course, an extensive literature on the psychology of creativity.

I think of a book edited by Brewster Ghiselin, *The Creative Process* (1952), which provides example after example of the last intuitive process that preceded the jelling of some major discovery, whether in science or in mathematics or what have you.

John Dewey's *How We Think*, published in 1910, is also pertinent. Further, Robert Sessions Woodworth, in a monumental book published in 1938, *Experimental Psychology*, devoted two chapters, on problem solving behavior and on thinking, to the psychology of creativity. The second of these contains a substantial section on Graham Wallas' *The Art of Thought* (1926), which elaborates on at least two of your steps. Wallas suggested that there are four stages in creative thought: preparation, essentially a matter of immersing oneself in the field, followed by incubation, analogous to the time you went out for the hamburger and cheese, when things just did not work and you occupied yourself with something slightly different; then came the crucial stage of illumination, what you have been calling, I gather, "intuition." The final step in Wallas' system is verification, in which you see whether the intuited solution actually works or not. This sequence, incidentally, is not unlike the one that Dewey described in his book.

Max Wertheimer wrote a book, published posthumously, *Productive Thinking* (enlarged edition, New York: Harper, 1959) which details this kind of thinking in example after example, including processes of verification, since there are better and worse intuitions or insights, good errors and bad errors. His examples go from something as modest as understanding why the area of a parallelogram is height times width, through some of Einstein's insights that led to the theory of relativity.

Also, a book was published in 1962, edited by H. E. Gruber, G. Terrell and myself, entitled *Contemporary Approaches to Creative Thinking*, in which many of these same ideas again come up in slightly different ways. Jerome Bruner, in the first chapter of this book, characterizes the creative product as one that produces "effective surprise"—a subjective state that people can experience even at the first grade level; it is essentially an understanding of something that previously was murky.

I think it is high time that this abundance of material gets back again into the schools, through the back door of new terms like Gestalt therapy, or whatever particular terms one happens to like. At any rate, it should be recognized that there is a long history to the role of insight in "real" learning.

Many Paths to Truth

Suzanne Helburn: I have been impressed in this conference with ways in which kernels of truth can be stated in such varying ways. That is one way to find truth; we all approach things from different ways and we verify the results against each other.

I want to add an insight of another nineteenth century genius, Karl Marx. He was very concerned about the course of human history, and therefore about the relationship between man and nature, and saw these as two faces of the same development—human consciousness on the one hand, which is a process of development, and nature, which is the outward material manifestation of human consciousness. These two things cannot be defined separately. They are one and the same. They are a unity of opposites.

It seems that this is a very important insight for children to get, and it is very important for teachers, because what it means is that human insight cannot come except through one's reaction to the outside world. This is a developmental process that goes through time. This is one definition of progress—continuing insight, continuing development of human consciousness, continuing development of the material world. It could also be a very destructive development. It does not necessarily have to be progress. But, I think this is an important kind of idea. From this point of view, all knowledge is insight.

Foshay: Finally, yes.

How Much Information Is Required?

Tedd Levy: It seems to me that some intuition occurs without a great deal of knowledge, and I find it difficult to accept the idea that saturation is necessary, as you had indicated, and I wonder if you could explain some more about that.

Foshay: My own view is that the information is never complete—never—as far as I can imagine. It is always more or less incomplete. By saturation, I mean complete commitment—saturation in whatever knowledge or whatever data one is trying to interpret. It could be sparse. That is why I included the illustration about the stereotyping of the little girl.

You give something as vague as "this is a girl," and you add, "she is nine years old." Do you know enough to do anything yet? Well, you do not, really. So, you add a little more. At some point you have enough so you can begin to form a stereotype. So, that is the response. That is to say, it is a question of greater or lesser information, never a question of complete information as against incomplete information.

In the case of my illustration of Arnold's poetry, I did have the entire published works and I had saturated myself for a long time, going over them again and again, and I could have gone over them another three months. What we encountered was not all there was to be encountered.

External Checks on Intuition

Dow: I am still way back with the business of your paper, and I think that you have suggested more than you really have admitted about the relationship between intuitive thought and something else. You referred to the writing as a clerical task. But it seems to me this is as crucial a task as the insight, that it is the rational transmission of the act of public communication, the testing of the validity of the insight. There is a continuing process; the paper gets read, you get feedback, your insight perhaps becomes refined as a consequence of that. But, aren't you saying that the two modes do interact?

Foshay: I do not, no. In my illustration, it was dramatic because the paper was complete in my mind and I did not have to write it down to know what it was. I could have left that as a totally private event. Things like that are not common, but they do happen. I did not really have to subject it to public view to make it any more real to me. Marshall McLuhan is a big Joyce man, and he likes to talk about outerances instead of utterances; one could have "innerances," too. So I was describing an "innerance" which was complete and satisfying to myself; the rest of it was sort of a chore, although I do like to write.

Lippitt: I am wondering what difference it made whether you had some self-confidence that you could produce something, and whether there was some relationship to an approval system. Many kinds of data could have a very strong influence on whether an intuition would happen.

Foshay: I think you are quite right. I will tell you, I was frightened. At 11 o'clock I still had big doubts about whether anything was going to happen, so there was this big sense of emotional release when something did happen.

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CHAPTER 5

KNOWING, FEELING, DOING

Ronald Lippitt and Eva Schindler-Rainman

Lippitt and Schindler-Rainman offer us a highly practical paper on the necessity for acting as a whole person. They point out that it is action, especially, that tends to be overlooked, and they offer many suggestions for the linking of knowing, feeling, and doing. For them, there is no question of dichotomizing. Any fragmentation of fractioning knowing and feeling is destructive to people.

It is in this paper that another theme, implied by others, emerges: Lippitt and Schindler-Rainman have a vision of what a person should be, and by implication, how society ought to be. It is fair to characterize their position as zealous, though they themselves are much too down-to-earth to be called zealots. There is a pervasively moral sense in what they urge upon us. Their illustrations of unlinked persons are full of pity. They ask us to celebrate successful linkage when we achieve it or find it, and they ask further that we overcome our unwillingness to celebrate successful conduct. One comes away from their paper and the discussion that follows it with a feeling that one has been in the presence of leaders with a mission in the world, and that the mission is holistic and healing.

Although our phenomenal world invites us to assumptions about persons as wholes, all of us are well aware that each self has many aspects and functions which may operate with more or less integration or disharmony. The focus in these papers and discussions is primarily on the complementarity or the fragmentation, the integration or the dysfunction, between types of cognitive processes—that is, between metaphoric and linear aspects of cognitive functioning, or between scatterbrained and hierarchical organization.

In our reflections, we want to focus on only one of the divisions within each person. We focus on the division between the functions of knowing, of feeling, and of doing.

We mean by *knowing* such ingredients as descriptive categories, metaphorical images, intuitions, assumptions, inferences about causation, generalizations, concepts, judgments, and clarification schemes. We are all familiar with the kinds of notions we have about knowing.

In *feeling* we include the many affective states: love and hate, anxiety and confidence, caution and boldness, paranoia and trust, anger and peacefulness, sadness and happiness, and so forth.

And by *doing*, which has been paid least attention in education, we mean such indicators as skillful, implementing, causing results, role-playing, risk-taking, acting, demonstrating, role modeling, and a variety of the motoric functions.

Most statements about the process of education assume that "the whole person" is being educated, that education results in some kind of integration of appropriate knowledge, motivations, emotions, and skillful behavior in various roles. We find ourselves puzzled by the evidence that, knowing a teacher's information about educational theory and plans for teaching a lesson the next day, it is not possible to make a prediction of the teacher's behavior in the classroom the next day. The correlations turn out to be zero.

We are also puzzled by evidence that knowledge of what is good behavior and that value judgments about right behavior do not differentiate between recidivist delinquents and "good boys" in the same city, and that feelings about self and others are often quite incongruent with actual judgments about and behavior toward self or others.

We believe these lacks of linkage are one of the most serious pathologies of human functioning—a most serious loss of resources for a satisfying selfhood, on the one hand, and productive contributions to the community on the other. And we believe these lacks of linkage are, to a significant degree, caused by and supported by the nature of the child's and adult's educational experiences.

We have organized this paper around six questions:

1. What are some typical examples of non-linkages and their consequences?
2. What are some of the conditions in the educational process causing lack of linkage or dysfunctional linkage?
3. What are some of the characteristics of personal functioning when we have effective linkage?
4. What are some of the characteristics of the educational process that result in the wholly functioning (well-linked) person?
5. What are the applications of this analysis to systems other than formal education?
6. What are some of the challenges for all of us?

Examples of Non-linkage

Here are some examples of non-linkage, with some of the possible consequences.

For example, a person says, "I know blacks have as much potential as do whites." That is knowledge. And yet, because of his particular life-style and experience background, he cannot believe this. Feelings do not match knowledge, and so it is difficult to act congruently toward blacks. A consequence of such polarization of knowing, feeling, and acting may be ambivalence, guilt, defensiveness, or other patterns of coping with intraself conflict.

Another example: "I know that teachers have a job of teaching me as a student. I know that getting good grades is important. But I dislike the teacher and I like the two friends I have who feel antagonistic toward that teacher." A consequence of such fragmentation of knowing and feeling may be not listening to the teacher, rejecting the acquisition of knowledge and skill.

Another example: I remember my music appreciation class in eighth grade. I remember Verdi's *Anvil Chorus*, and I remember looking over at Marie and saying to myself, "I am going to get 100 and be ahead of her this week in music appreciation."

Now, I do not remember any feelings about the music and I do remember that when I went to that opera as a young college student, the major feeling I had was, "Gee, I wonder how many are appreciating this more than I am?"

And it was some decades later that I went to that opera and I had feelings congruent with what was going on, and I was able to enjoy it.

Another example: "As a teacher, I am feeling angry and frustrated by the sadistic behavior of a child toward a weaker peer. I know that severe punishment, which comes to mind, is not likely to provide a learning experience for the offender." A consequence of such a conflict of knowing and feeling might be the dominance of one modality—punishing or suppressing—or it might be a search for an integration of data from both, or avoidance of the problem-solving effort entirely.

Again: "I know what politicians are doing wrong, in not carrying out some of the mandated housing regulations. Especially, I know what is not being done with affirmative action regulations in relation to single females obtaining housing." I feel angry about the unfairness of it and feel no support for my needs. I also see therefore no action possibilities for me. The consequences of this kind of frustration between knowing, feeling, and doing might be the feeling of fight and commitment to change the situation—a stronger commitment to fair housing. Or it might be feelings of impotency and depression about "not being able to do anything," or loss of interest in the whole thing.

Another example: The teachers who know the importance of parent-teacher conferences and feel very anxious about interaction with the parents—even threatened. They perceive the lack of skill in themselves in having effective, meaningful parent conferences. The consequence that is rather typical of this lack of linkage, of knowing one thing and feeling another, is a feeling of depression and incompetence because of lack of skill, and a disposition to rationalize the non-value of parent conferences. Thoughts and feelings might include: "Maybe the conferences would not do any good anyway; parents aren't interested in kids," "Well, I should not have worried about it," or "I'm not going through this again."

These then are some vignettes to remind us of the many patterns of non-linkage or dysfunctional linkage between knowing, feeling, and doing in the everyday operations of our educational programs and efforts.

Sometimes the parts of the self are polarized and function competitively rather than functioning collaboratively. Sometimes knowing dominates feeling, or feeling floods out knowing; often knowledge is rewarded and feelings are ignored, disciplined, or suppressed. As a consequence, not all the resources of the self are available for learning or for the utilization of learning. There is a variety of reactions: ambivalence, apathy, unawareness or inhibited feelings, feelings of futility, impotency regarding self, and hostility and avoidance.

Conditions Causing Lack of Linkage

What are some of the conditions of socialization and education which cause lack of linkage or poor linkage? (There can be linkage, but of a dysfunctional sort.)

First of all, there is the fear in most learners of risking action, of linking knowing and feeling to the more valuable function of action. The young have learned that when they experiment with action the chances are, studies would say, 12 to 1 to 5 to 1 that they will be criticized or punished for the doing effort. They learn quickly that it is much safer to think and feel than to do.

A second condition: the curriculum provides very few designs for practicing doing without playing for keeps; there are few situations in which alternatives can be tried, consequences explored, and skills perfected in conditions of safety and supportive feedback. This, by the way, is just as true of the teacher learning process as it is of the student learning process.

The third condition arises from the fact that most of the rewards for learning efforts are for knowing facts that can be poured back out on an examination. I can remember giving all the facts and getting A's, but I could not really recall them later. I could recall my feelings about the teachers and the situation. Better learning took place when I felt good.

The rewards are for learning efforts and for knowing, and closure is usually at that point. If you can summarize the knowledge, if you have gotten the concept, if you use the facts to derive generalizations, you are okay and approval is easy to receive. Connecting knowing to feeling or to doing is not part of the reward procedure. Emphasis is placed on critical understanding and on analysis of the behavior of others. In fact, stature is accorded to the people who are perceptive critics of others.

Another restrictor is the Puritan ethic. The Puritan ethic offers strong guidelines for many of our educational demeanors. Many feelings are not nice—especially hostile ones. You should not express them, and you should be uncomfortable about even having such feelings.

Closely linked to the Puritan ethic is the belief that we are supposed to be close to some image of perfection, in our achievement and in our morality. So our grades show how far short of perfection we are rather than how much progress in growing we have made. This greatly inhibits the experimentation we need to link knowing with feeling and doing, because of the revelations we would provide to others about our own lack of perfection.

Then, to a high degree, the inquiry into feelings is missing from the agenda of teachers and curriculum developers. Teachers feel inadequate, uptight, threatened by the sharing and exploring of feelings and the creative use of data about feelings as a part of any inquiry process.

There is also the avoidance of the responsibility for impact on the whole person. In addition, there is the fear of reciprocal openness in sharing feelings. Both are avoided through fragmentation of learning.

Teachers are also pressed to cover certain materials and so really see very little time to link knowing to the utilizing of knowledge, to feelings, to setting goals and developing action plans. In many areas of social studies, the linkage to doing might be risky for the teacher.

One of the things that often comes up when we look at field experiences, or students trying things out, is the teacher who says, "Well, what if they goof? What will happen to me? How will I look?" Or, when we make a simple suggestion to have open house where everybody's work is available for parents to see, and you could have just a wonderful evening sharing what some people do better and some people don't do so well, the teacher says, "Oh, but how will I look?"

Very few teachers have had the opportunity to learn and develop the skills needed to create learning situations and sequences which effectively link knowing, feeling, and doing. Even if they wanted to do it, there is very little skill or know-how available to them to do it.

So, for these and other reasons, the designs and opportunities for learning which the young and the olders experience tend to stimulate and reward the development of a fragmented, divided self. This self comes to ignore the retrieval of knowledge from doing that is critically needed for the development of an open, whole person.

Characteristics of the Linked Person

We shall now take a look at some of the characteristics of the linked person. Let us think about what it would take for a person to have the opportunities to develop the linkage of knowing, feeling, and doing.

One of the characteristics is that both knowledge and feeling data are accepted as sources for action, that the person has a model of the total utilization of self and understands knowledge, feelings, and actions as linked and interdependent.

Secondly, links are made between appropriate goals and effective action steps by the person, and these are guided by knowledge and feelings leading to congruent, skillful actions which represent both knowledge and feelings.

Third, the linked person is able to learn through both knowing and feeling, in a variety of settings, and is able to link them to doing.

Another point is freedom from the one-answer posture. Certainly, the well-linked person has a variety of possible cognitive alternatives and action alternatives available as a part of any kind of meaningful, easy flow from knowledge to goal setting to planning to acting. Living with the commitment to alternatives and the commitment to making decisions among alternatives is certainly one of the bases of a creative learning process.

The linked person has self-acceptance, and freedom to celebrate is one of the characteristics of self-acceptance. You can't very well celebrate if you do not have self-acceptance. The continuous support for self-acceptance that comes from celebration is an important element. When you ask teachers to look at how to celebrate the fact that we have gotten somewhere, or that we have finished something, or whatever, they are really pretty stuck; the word "celebrate" is fairly uncomfortable for them.

Another important characteristic is that the well-linked or whole person can give and take evaluation feedback about knowledge and feelings and translate this feedback into internalized notions of new and better actions.

A final characteristic is that the well-linked person is willing to risk action based on the integration of knowledge and feelings and has developed the readiness to risk utilizing these resources of knowing and feeling in an action commitment.

Characteristics of the Educational Process to Develop the Linked Person

The fourth question we asked was: what are the characteristics of the educational process that result in the whole, well-linked person?

We feel that education can certainly be a major factor in the development of the whole linked person—that ideas and methods are available, and so are teachers. If teachers do not know the ideas and methods, they could certainly learn through workshops, in-service seminars, etc., that the skills are acquirable for use in the processes suggested below.

In order to encourage development of linked whole persons, the task for the teacher is to give opportunities for learning behavioral skills through practice in "safe" situations, with opportunities to try out and to experiment. Here is an example. Think of someone who is hoping to learn how to make a speech. It is helpful to know how to write it out, and to know what the outline might be for making a good speech. It certainly helps to feel confident about that and to know the content. But the real trick comes in giving the learner the opportunity to practice and repractice making that speech before he or she has to do it for real. We find, in all of the training we do, that one of the things that people most appreciate is getting an opportunity, after some kind of theory input or a discussion and after letting out some of their feelings, to translate knowledge and feelings into skillful try-out action before they have to do it in actual situations.

Another major characteristic of the curriculum for linkage is the legitimizing and creative coping with feelings among learners and between learners and teachers.

A favorite client group of ours at the moment is a fifth grade class in which, on a two-week basis, the students have a series of ratings that they have agreed on with the teacher. There are six weighted scales on which they indicate where they see her, and draw little arrows to where they wish she were on the scale. While they are doing that, the teacher is doing a set of ratings showing her feelings about them as a learning group. They exchange both feeling data and specific cognitive data. Then, after the Little Research Committee puts the data from the students together and gets the teacher's data, the data are put up on the board and they negotiate goals for improvement. The fact that it is a reciprocal rather than a one-way process is one of the critical aspects.

As the late Douglas McGregor would say, students are willing to accept influence from a teacher in the degree that the students perceive the teacher is ready to accept influence from them. It is this kind of reciprocality in the area of feeling that seems to us to be one of the important conditions for growth and learning.

Another is feedback by the teacher to students on both the knowledge acquisition and the expression of feelings as guides to linkage to actions. It is vital to connect feelings to postures and conclusions about alternatives for action. It is important to avoid the notion that we seek to link a particular set of knowings and a particular set of feelings that belong to everybody there. Rather, there are integrations which everybody has to work through and has to be helped to work through, and there is a variety of alternatives available.

Another characteristic is empathy training. We think it is possible for learners to learn to differentiate feelings, thus becoming more sensitive to their own feelings, and also to those of others. This is not exactly stepping into the shoes of others, but becoming sensitive to their feelings.

Students can learn to move from the purely competitive feelings toward their peers to feelings of help and support. Perhaps it is possible to help students learn that when they are really good at something they can help others be good also. For example, a student who is great at swimming could be helped to see this ability not only competitively but also to see himself or herself using this skill to help and support others to improve their swimming as well.

Another classroom has a sign in the back of the room: "Who is Good at Doing What Around Here?" And each student has a sign about his or her strengths. They have interviewed each other about their skills, such as shooting baskets straight, jumping rope right, math, etc.—and it is now a sign of strength in that room to list your abilities. The number of kids another kid uses for help in a given week is one of the things they are proud of. The teacher has a sheet up, too, about the kinds of things he or she is particularly good at so that the kids do not begin to think that the teacher is good at everything, and therefore can be more selective about their requests for help.

Students we interviewed there recently about how they felt about the teacher, said: "We have an awfully good class, but now the teacher spends an awful lot of time over at the desk alone. We wonder if she is wasting time." The students rely on themselves more, and the teacher less.

There is another condition for producing a linked person, namely continual activities that support linking cognitive awareness and feeling to images and plans for behavioral actualization. Supporting some kind of a sequence of deriving goals, of assessing alternatives, of planning and practicing first steps of action, is crucial. It need not be John Dewey's sequence of steps, because approaches vary tremendously from one student to another.

Another condition that we have come to feel is important is the technique known as internal dialogue, developed by John Rickman, a psychoanalyst in

London. He developed the idea that although we tend to think of a person as a whole, the person has within him an internal group with dialogue going on between voices or different parts. The problem is one of achieving awareness of and sensitivity to the variety of voices within the self.

The internal dialogue method encouraged students to make explicit their voices, through writing a dialogue, as though it were a script, of the various voices they can hear within themselves and how they really feel or think—including feelings of ambivalence, for example. Students might write a dialogue about how they feel about taking a qualifying exam for college, stating the voices that are supportive as well as the voices that are scared or non-supportive.

When starting an extension course with teachers, we ask them to write a dialogue on all the voices within them that are wishing they were some place else rather than taking this course, and the voices supporting their being there. We then ask them to share those dialogues. Together we discuss the legitimacy and the relevance of this dialogue and the variety of feelings and motivations of different students.

Another factor to be considered is the development of both process and task awareness. We often do this through what we call stop sessions. That is, while a group is doing a task such as a small group of students studying together for an examination, they can stop halfway through their studies and look at how they feel about their productivity. We usually do it on a four-point rating scale—feeling very productive, somewhat productive, not so productive, not at all productive. We ask them not only to check how they feel, but to jot down why they feel as they do. Then we ask them to jot down and discuss what we could do to improve the way we are working together so we can be more productive. If it is in an hour's meeting, we do these short stop sessions at the half hour so the group members can immediately use the suggestions themselves to improve their processes. This is an example of integrating feeling data with task work.

Another suggestion is for help in becoming sensitive to and skilled in both verbal and nonverbal communication. For example, recently there were ten Jesuit priests in a workshop who felt that their verbal communication was pretty good, but that their understanding of nonverbal behavior, both their own and others', was zero. They were given opportunities to practice several kinds of nonverbal communication exercises. They became more comfortable with themselves and each other in both the verbal and nonverbal realms. Then we looked at ways to transfer their integration of verbal and nonverbal sensitivity into teaching and helping students learn.

Another of the crucial conditions is that the teachers recognize and accept students who have different learning styles. Some students can learn working with peers. Others have to be alone with a book in the library. Others have to be out in the community having a project. There is a whole variety of different entries into the learning process, all of which need the support of this kind of linkage, but in which the entry might be a quite different entry from one student to another.

Also, teachers need really to learn how to reward the carrying through of problem-solving patterns, moving in a creative way from inquiry and diagnosis to goal setting, to exploring, to action trying, to exploring feelings about their alternatives, and evaluating and retrying. Those patterns are what need to be rewarded, rather than the closures that stop movement from the knowing to the feeling aspects of self.

This is just a small sample of the kinds of methods of affective education, of problem-solving education, of reality-practice education which have become available, but still very little disseminated, still very little understood, and certainly very little emphasized in teacher training programs.

The resources are available but there is, as yet, very little support for the dissemination activities.

Applications to Other Systems

The reflections above on individual learning also have some implications and parallels in the group, the community, and the organization. This is interesting, because the individual is imbedded throughout his life in face-to-face groups like families, classroom groups, and community groups, and all of these groups face the same kind of critical linkage issues. Many of us need skills in helping groups be more productive. With the emphasis on accountability this is very important to most educational institutions. The lack of linkage between problem diagnosis, goal setting, action planning, action commitments, and implementation is a serious problem most groups face.

In work groups, awareness of the interpersonal emotional processes which are part of the work process are submerged. Using process intervention to bring feelings to the surface and to use this information for improving work is one of the most important developments in current efforts to improve group productivity.

If we go to the larger system level of organizational functioning we find comparable issues. Departments or other subparts of the system are involved in polarizations, or avoidance of communication. The poor retrieval and utilization of feelings about work conditions, including things like poor communication and inadequate supervision, are key blockages to the improvement of productivity.

In the community as a whole there are tremendous problems to linkage between subparts, whether these be agencies, institutions, organizations, or people; between thinkers, planners, and doers; between special interest groups and the establishment; and between the energy and feelings of the young and the wisdom and caution of the older. Our work with communities indicates a great need and hunger for linkage mechanisms of all kinds and roles which somehow will help link and integrate the functions of knowing (research and planning), feeling, and doing—in the form of task forces, for example. At the community level there are energies of discontent and energies of hope, which are rarely dealt with or harnessed in any useful way.

Concluding Challenges

Now some concluding challenges. From the remarks and reflections we have just shared with you, it becomes clear to us that we are presented with some interesting thought and action-provoking challenges about these linkage issues. We arrive at the conclusion that it is possible to provide effective educational designs that do link knowledge with feeling and these two with action, within classroom walls. It does not have to be entirely based on the notion that there has to be field work for everything, that there has to be the big world involved in all of it. Of course, that is important from many aspects, but whole cycles of support can be within classroom walls in quite a feasible way.

There is a major challenge to learn how to elicit the variety of data about feelings which are a part of any learning activity, and to convert this elicited data into decisions, actions and the checking of knowing.

Another challenge is that teachers need to have the opportunity to experience the integration of knowledge, feeling, and action as learners, and to integrate this learning into their own teaching activities. It is not enough to learn the techniques. There must also be opportunity to experience the whole integrative process.

There is also a need to develop curricula that provide opportunities to practice linkage of knowing, feeling, and doing with skill practice situations as an integral part of the experience.

There needs to be much greater encouragement of the sharing of successful practices in the development of procedures for linkage and of helping develop whole persons. This should be at the level of retrieval conferences among practitioners with carefully prepared instrumentation to document and disseminate the practices that have been developed.

Application of these principles is important for education, for group development and productivity, for better organizational functioning, and for improving the quality of life in the community.

We hope that in this presentation we have been able to link our ideas, values, and feelings to your experiences and to your priorities about teaching and learning.

DISCUSSION

Teachers' Views of Children

Luther Ford: Ron, near the beginning you mentioned the fact that there is zero correlation between teacher plans and the implementation of those plans in the classroom the next day. What are some of your personal thoughts as to why this is so?

Lippitt: First of all, I think the ritual of lesson planning has not really been integrated with the faces of kids and with classroom dynamics in the teacher training activities, and certainly teachers have not been helped in any way to make any derivations from educational philosophy to practice. The process of making the derivations and having the chance to try out the implications has not been supported. The reality of dealing with the here and now of action has really not been connected up with the cognitive training process.

Schindler-Rainman: I think there is another reason. Many teachers do not look at their class as a group of individuals. They are not at home with questions like "What are all the things I know about my students?", "How do they differ?", "How can I plan particular things so that they will fit this particular group of children and every individual student?"

Lippitt: We find examples in our cross-age helping program where we teach sixth graders to work with first and second graders. The olders, in their training programs, become certified to be helpers. They learn to interview the receiving teacher about the particular needs of the child they are going to be working with. We find this is often the first time many of these teachers have thought, diagnostically, about the differences between one pupil and another.

Congruence and Integration

Mark Phillips: First, a question of clarification, and depending on the clarification, I may have another question. I thought I understood the use of the word "integration" as you were using it, but I was not sure from the beginning of the presentation whether you were using the terms "congruence" and "integration" interchangeably.

Lippitt: I do not think so. I could be wrong in the uses we made, but by congruence, we meant that the feeling data and the cognitive data both supported the same resultant action. Integration meant putting those two sets of data together to come out with an emergent which is original and different from what you would predict from either the knowing part or the feeling part.

Phillips: My next question is whether you perceive congruence as always being good.

Lippitt: No, because congruence can exist perfectly well in a fragmented person in which there is no interchange between the two parts. But, the two parts have both been "brainwashed" the same way, so that your feeling flow and your knowing flow may be congruent, but may not have the advantage of interaction to create a resource that helps create a whole person.

Phillips: Can you perceive the whole person acting in ways which are incongruent?

Lippitt: Surely, because in most situations a whole person is involved in the decisions that he or she makes with multiple values, multiple opportunities, multiple potentialities, so that there may be all kinds of bases for inconsistency, for the momentary dominance of one value and then the other.

Phillips: I appreciate that. You gave me the answer I wanted, but I was not sure from what you said originally whether we were in agreement.

Schindler-Rainman: I am glad you asked the question, because I think we did use the two terms interchangeably a number of times. So I think you clarified it for us, too.

Legitimacy of Feelings

James Davis: Ron and Eva, you used the term legitimacy, saying that we should make legitimate the dealing with feelings. I guess I was not sure whether the suggestions you made were of actions or activities that would contribute to legitimacy, or whether you had more to say about what might be done to make dealing with feelings more legitimate.

Schindler-Rainman: Well, in our suggestions we did not just talk about feelings. We talked about knowing, feeling, and action, not just feeling. Some of our examples addressed themselves more to feeling than to other things, and I would guess what we were really talking about is legitimizing the linkage of the three toward more whole action.

Davis: Which means giving weight to all of them, which means typically that one should do more about feelings than about the others, because they have been more neglected, so that in things like the internal dialogue, the language of feelings is encouraged. Certainly encouragement is needed in the eliciting of data about how I am feeling, about how I am being accepted by others right now in our classroom process.

Schindler-Rainman: I think another way is through role playing, to help teachers learn how to accept different kinds of feelings. We talked about acceptance. That is such an easy word, and such a damn hard thing to do. So one of the things we have been doing is working on typical situations that teachers bring, of feelings they have not been able to handle well, particularly feelings of hostility and dislike. Then we give them a chance to really practice by role-playing how to handle a whole range of feelings. This then leads to a broader acceptance of more kinds of feelings, rather than just the "nice" ones.

A Comparison with Systems Analysis

Al Kuhn: I have a little conceptual problem. I am trying to relate the way you have put these things together with the way I have tried to do it. You talk about knowing, feeling, and doing. I use the trio of knowing, wanting, doing—wanting meaning liking or disliking. These are generic terms coming out of systems analysis, derived from *detector, selector,* and *effector*. I agree with you that it is the entire action of detector and selector which leads to a decision and to an action.

Now, in that kind of formulation, as I see it, the first, *knowing*, is simply the question of what is it, what is the state of affairs? The second one, the affective, or the feeling, the *selector* aspect, would be what is my feeling about it? That is, do I like it or dislike it? Do I approve of it or disapprove of it?

Now, if you separate those things into pure cases you would not be able to talk about an incongruence. They are simply different dimensions, and the question I have is: can you talk about an incongruence between knowledge and feelings unless you are taking the term "feeling" to include knowledge?

Lippitt: Let me react first on that. I think you have narrowed it down to a very rigid little notion that feelings are instrumental to knowing, as I heard you. For us this whole business of intention setting, or the tendency toward acting, comes, I think, as an emergent of the entire interaction of the feeling aspects and knowing aspects. The intentionality notion grows out of the interaction of the two, knowing and feeling, where things like goals, plans, and intentions are emergents of the entire interaction of the feeling and knowing processes, emerging as a linkage to action.

I suppose one of the problems is that we have such a poverty-stricken language for talking about the feeling aspects of data in most situations, because we have not done much of it. So when I heard you say, *wanting*, or *pro* and *con*, that is such a small encompassing of the dozen variations of feeling we indicated as potential parts of a definition—the loving and the hating and the feeling and so forth. This is far more than the intentionality kind of thing.

I think you also left out of the cognitive side a lot of the metaphorical things. Maybe you did not. I would say there is a much greater richness in subparts of that whole knowing aspect than you have expressed, as well as in the feelings. Knowing and feeling data come both as representations of what is out there, and what is coming in, and what is in here that is activated by the out there and the interaction of them. Out of that interaction of what I want, or what I plan, or what I will do, or what I am inclined to do, emerges partly a cognitive map of doing and partly an affective and motivational support for doing.

Linkage and Safety

Wells Foshay: I wish you would help me believe that I could establish more of a linkage in my classes between feeling and knowing and doing than I have, without the class blowing up. I would like to feel safer than I feel right now.

Let me tell a story on myself. I once was teaching a fairly large class, 80 students, and I wanted to deal with evaluation, so I raised the question of the evaluation in this course. What came out was the students' pent-up rage from 16 years or 20 years of injustice with academic evaluations.

This was far more than I could handle. The class blew up and the lesson was a failure. It was pretty obvious what I thought I was doing, but I want to feel safe because I have not got the nerve to try that again.

Schindler-Rainman: Well, you tried it on a very risky topic, first of all, and if you had not set any precedents for students interacting with you, then it was doubly risky. Let me give you an example, if I may, from a class of that size and a little larger. In the very first session they all sat around in tables of six. I think yours is a difficult question to answer without also looking at the physical ecology. They came in and we had music on the record player and they could sit anywhere and they could make their own name tags and there was a kind of participatory feeling.

In the very first three hours, I raised the question: how many of you are very concerned about grades? These were teachers. Well, it was like 98.5 percent. Okay. Should we maybe get that question out of the way before we go on? Yes, we better. So I had them in their groups of sixes and said, "We are going to be together for five days from 9:00 to 4:00 every day. What should be the criteria for evaluation in this course?" I asked for volunteers who would be willing to help me read the group products afterwards, because I thought their trust level might not be very high if I read them and just gave them a report. Their job was to summarize and the next day come up with some suggestions for grading. About 30 stayed and I had to divide them into subgroups to look at all the stuff, but we came up with recommendations for the total class that included the things I thought ought to be included. I put my ideas in also.

Foshay: This is helpful, but it does not help me with one part of it, which is to anticipate that a particular thing I am going to raise is going to be explosive. I did not know the gun was loaded in this instance.

Lippitt: Well, let me suggest a couple of operating principles. One, as Eva illustrated, never raise an issue like that with the group as a whole sitting there as 80, because you could be pretty sure that the first three or four to speak up would be the most counterdependent and would have the most pressure on repressing other group members who felt differently. So the first thing I would do is make this a small group task, tables of six, or if they are sitting in those arm chairs, like at Columbia, you make trios or quartets.

You ask them first of all not just what should grading be, but what are all of the possibilities for a good grading process here. And then they send up representatives for an open dialogue with me with a chance to caucus with their subgroups. They can go back and get further instructions so they can find out whether the group they are representing is fully satisfied. There is open negotiation. The whole group is represented, fairly. There should be an honest dialogue or interaction rather than mass reactions.

Eliciting and Accepting Diverse Views

Edith King: Maxine Green described the sociologist-phenomenologist's approach to looking at and accepting the social reality in a situation. This comes from George H. Mead, the idea of more group feeling, group culture, the culture of the classroom. How would you fit this into your scheme, especially what you were saying about the emergent feeling in the situation?

Schindler-Rainman: In working with teachers in classrooms, or in looking at my classroom, I know that people come in with a certain preconceived way of acting. This is the sort of taking-for-granted way of acting in a certain situation, but maybe one actor has one interpretation of social reality while another actor or set of actors has a different one.

Lippitt: I think I hear a couple of different things, I am not sure. One is a kind of diagnostic or assessment approach to where a group is, which makes it possible for the participants there to freely share where they are rather than to be railroaded either by past norms or by some outspoken first talkers. That is one kind of question, as I hear it. This is the question of what kind of designs for diagnostic inquiry it is possible to have. There is certainly a great variety that begins with the little sheet on the table in front of each person as they sit down, or even as they enter the room, in which they have a chance to check the kinds of things they want to learn, or feel, etc. You put the data together and talk about the results, both the feeling data and the needs data, in an objective way. This

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would be one way to help a group move toward group norms which support individuality and safety in expression of feelings.

King: I would like you to speak to that, too, in a broader context.

Schindler-Rainman: I think there is a whole variety of ways. Our friend, Irv Millgate, says that if you want to do some of these things, you have to defy expectations. For example, take expectations setting. Here is an example from the University of Hawaii. It was the last session of a course for women that was started in September, 1974; I did the first three days and the last session. It was a long time from September, 1974 to May, 1975. As they came into the last session, there were three sheets on the wall for them to write answers on. One said, "All the things I think right now I have learned in this group leadership experience."

The second said, "All the things I wish we had done that we didn't do." And the third sheet asked, "All the ideas I have for how we could spend our time today."

The sheets were separated so people did not have to stand in a long line. They could talk to each other, they could sign their names or not. All sheets were filled out as people arrived. They provided valuable data for retrieval, for content, for that last day, and a way to set the stage for the participants. It caused them to think about the course, they said.

Lippitt: Another thing is how you respond to those data. That really does a great deal to help legitimize them.

Schindler-Rainman: A team of three summarized the first two sheets immediately. Then we acted on the third sheet by building the day's agenda, using their suggestions.

Lippitt: You could express enthusiasm for the data and for its diversity. I was working recently with a bishop and his staff, and they wanted to look at value dialogue around serious issues. I put on the wall a four point scale from "Agree very much" to "Disagree very much." The Bishop and I agreed on an issue the night before that would be good to start with, so I read the statement and said, "The second time I read it, please stand up and walk to your positions."

The statement was, "In our society, every male and female should have the freedom and the right to establish relationships with any other person at any level of intimacy if there is mutual consent." I asked the Bishop to walk slowly.

At the second reading, they stood up and they walked. A perfect distribution, a perfect distribution across all four positions, and here is the critical point. I said, "My, what a wonderful thing we have. We have diversity here, which makes it possible to have real dialogue."

Schindler-Rainman: This value dialogue technique, used very early in the group, is helpful in legitimizing four different positions, and really changes the whole feeling of the group from pressures of conformity to an appreciation of pluralism. There is certainly no effort to get a consensus, and usually we ask them at the end of the discussion to summarize by listing the number of statements that would represent where people are in the group right now. So you might have seven different statements, if there are seven people in the group

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who don't agree with one another. It is very rarely that they come out with one statement.

Lippitt: We also had two stop sessions in that dialogue. They had been told to try to sell their point of view as actively as possible and to listen as actively as possible. So the first stop session was quickly checking how well they felt they were being listened to, and how well they felt they were able to listen. They shared the data with each other and consulted on a decision on how to improve their dialogue for the next 30 minutes. At the end of the 30 minutes they had another stop session to decide what proportion they were of listeners, as a group. Were they 50-50 listening and selling, or 25 listening, 75 selling, or whatever? We then took a census and they held their hands up, on what if anything they found as consensus about where they were as a group. Then they had another chance to make a decision about whether and what they wanted to change in the next 30 minutes.

So in summary, there was stopping, looking at feelings, using data, legitimizing it, and acting on it, as a result of the process work.

Trust and Hierarchy

James Eckenrod: You talked about a hypothetical organizational situation in which the leadership is rigid and authoritarian. What if subordinates tried to improve upon their personal skills and interaction with their co-workers, and find themselves in trouble and in situations where trust does not go up or down but where it is only horizontal. What can the subordinate do?

Schindler-Rainman: Let me give you one notion and also a kind of principle to get at that kind of thing. The first thing you need is a vertical group to plan the whole effect; subordinates cannot do it by themselves; there ought to be subordinates and middle management, and if there is a layer between middle management and the top, that needs to be represented.

An example is a two-year effort I have just been involved in with a school district where our biggest effort was to get the superintendent to see how badly we needed vertical participation rather than his saying, "My associates will do it and the rest can then act on their decisions." Instead we developed a vertical group made up of persons to be affected by the planning and decision making. Trust was developed between the superintendent, his associates, and persons from the other levels of the district as they worked together.

Skillful horizontal subgroups can sometimes affect the whole system, but this is rare; they need help.

CHAPTER 6

TOWARD A SYNERGY OF MIND: PSYCHOLOGICAL PREMISES FOR EDUCATION BEFORE 1984

Robert E. Samples

A theme that appears for the first time, in the paper by Robert Samples is, as he puts it, trust. Without a trusting relationship between adults and children, the children will take the safe course, which is the logical, linear, rational, "left-brain" route, and all those imaginative functions associated with the "right brain" are ignored or lost. Samples points out that children are exceedingly aware of any contriving by teachers, and that they respond to contriving with "safe" behavior. This is true, even if the contriving is intended to bring about right brain behavior.

Unlike the other writers here, Samples makes a clear distinction between left and right brain hemispheres, and believes that such a clear distinction is supported by neurophysiological research. While he acknowledges that the two hemispheres act in concert, he believes that the functions of the two hemispheres are sufficiently distinctive to require special strategies, too.

Like the other writers here, Samples seeks to countervail the overwhelming emphasis in schools and elsewhere on the rational and the scientific mode of knowing. Consequently, his emphasis is on the metaphorical, the imaginative, the intuitive. He traces the history of his own thought in this realm. He, too, sees an alternation between the two modes of thought: "An overwhelming majority of human decisions are made in the intuitive, metaphoric, right cerebral hemisphere. They are then explained in the rational, logical, left cerebral hemisphere."

Recent neurophysiological findings verify the long-known notion that the human skull contains two minds. The two minds are represented in most humans by the differentiated function of the left and the right cerebral hemisphere. The operation of the left cerebral hemisphere in most adults is typified by processes that are linear, rational, and digital. The right cerebral hemisphere, on the other hand, typically operates through metaphoric, intuitive, and analogic processes (Ornstein 1972, p. 50).

What this means in a pragmatic sense is that the left cerebral hemisphere, or the rational mind, typically attempts to reduce sensory and other input data to the smallest number of variables. These in turn are manipulated by further reduction to the most rational and logical of conclusions. An example of this is formal use of language, the attempt to designate rather specific and precise meanings to words.

Conversely, the right cerebral hemisphere appears to be highly comfortable with the processing of multiple data simultaneously. In contrast to the left cerebral hemisphere the right cerebral hemisphere actually seems to multiply the kinds of awareness triggered by a single input. The nature of the diversity of the resultant awarenesses might vary to include images, symbols, figural meanings, and relationships that have to do with initial input. In a sense the informality of the "tacit knowing" spoken of by Polanyi (1966, p. 4) might well typify the function of the right cerebral hemisphere.

Two Assumptions

In the following discussion of synergic education or educating toward synergy, two assumptions must be kept in mind regarding the arguments presented. First, though much of the discussion will focus on the activities and the educational implications of an awareness of the right cerebral hemisphere functions, this is not to place it in the position of priority. This is simply a reflection of past and present overemphasis on left hemisphere functions. The overemphasis on the left is not wholly in the past. Contemporary educational practices also focus primarily on the left cerebral hemisphere functions. Many of the philosophical and psychological premises as to what constitutes learning also focus on the functions of the left cerebral hemisphere. Language and, in fact, reading, writing, and arithmetic are primarily left cerebral hemisphere functions as taught in the schools. Because I choose to talk about the synergic outcomes of actualizing *both* hemispheres and their potentials and because history has essentially made such an indelible case for the left cerebral hemisphere, there may be a tendency to overstate the functions of the right.

The second assumption in these discussions will be essentially that we are dealing with normal or normally differentiated brains. These remarks will not apply to brain-damaged or dyslectic children, although the symptoms of dyslexia, hyperactivity, and other special educational problems of *remediation* have been discussed by others in terms of their relationship to *conflict* between the right and left hemisphere functions. Since our purpose here is to deal with health, not illness, growth, not survival, we will leave these problems to others. The fruits of their studies, however, will undoubtedly provide us with many clues which will support the notion of a "positive dyslexia"—a creative integration of left and right functions.

A disclaimer that I would like to make at this point is that in no way will the material covered in this statement be an attempt to exhaustively review the literature. That is done far more appropriately and far better in other places, references to which are cited. Let it suffice to say that the brain hemispheres function in different fashions and that these functions can be verified by clinical research in neuropsychology and neurosurgery. This is an accepted tenet of this presentation. The primary focus of this discussion will be to explore the implications for education of this growing field of psychology.

Right- and Left-handed Thinking

I first heard about the problem of right- and left-handed thinking when working during the summer of 1962 with Jerome Bruner in Cambridge, Massachusetts. Initially the work began with the Elementary Science Study and the research and development approaches that were being explored with National Science Foundation funding. Bruner's work was introduced to me through clinical observation debriefings, conversations, and his fascinating little book, *Essays for the Left Hand* (Bruner 1961). Until that time the metaphor of left-handedness and right-handedness as an expression of the modes of knowing had only been made known to me through such homilies as "blessed are the people who sit on the right hand of God" and some vague reminiscences about the "right hand of Virtue." Also I was aware that the capricious, unpredictable left hand was the hand of the devil—sinister—and always led folks into trouble.

Eventually we began using references to right- and left-handed thinking or problem solution strategies as metaphors while watching children engaged in the exploration of science activities. The activities varied. Some involved apparatus, others involved examination of and inquiry into the natural world. Some involved controlled experiments, some related to what at that time were fashionably called discrepant events, the tendency for some experiences to offend one's intuition about the way things should happen.

An example of a discrepant event would be when ice cubes were dropped into otherwise identical beakers filled with a clear fluid and the ice cubes floated in one and sank to the bottom of the other. Children are not used to seeing ice cubes behave in ways other than floating on top of water. As a result, it usually offends the intuition of children when they see an ice cube sink in a glass of clear liquid. The mystery, of course, has a simple explanation: one glass contains water and the other glass contains alcohol. Even rubbing alcohol is low enough in density so that the higher density ice cube sinks in it like a rock. At any rate, when children became involved in this variety of learning activity, one of our jobs as observers was to watch what they did. With careful enough observations and a high enough trust environment, patterns of behavior seemed to emerge that provided us with some consistent opinion as to what was taking place.

The Importance of Trust and Intuitive Exploration

Trust was vital to insure the above-mentioned consistency. As a result we worked carefully to establish trust among the observers, teachers, and students. In this atmosphere, with a high level of trust, the children did very little to mask their behaviors. As a result, their motivations and behaviors were remarkably consistent. This is, unfortunately, a condition that is too seldom seen in everyday classroom environments. In our presence the children were not going to get graded, their parents were not going to be told about their performance, and in fact this gaggle of teachers that had appeared from various parts of the country seemed to be more like big students than they did teachers. With all of these elements of the environment in our favor, it was easy to watch the kinds of things that took place. The children, when first confronted by a problem, almost immediately began to explore the learning sequence in an intuitive or a metaphoric fashion. They would call on the prior experiences and tacit knowings that had woven an informal tapestry out of their personal lives since the time their minds first began recording information and experience.

The nature of this first pursuit almost always involved a variety of senses and input, other than strictly visual. The students would pick up the objects, or pick up the materials that they were to use, and tactilely involve themselves with them. They very often would taste them or hold them against their face while they seemed to think about other things. They would often rub them in their hair and otherwise generally affiliate with them at a level other than simple visual contact.

While engaging in informal tactile activity with the materials the students very often would begin to verbalize strategies of pursuing the problem toward a solution. Most often these initial expressions were highly metaphoric in nature. The students often drew analogs between this experience and situations they had experienced in the past. A student might say, "this ice cube swims like my little sister." They might generate a potential solution that started, "Let's get a bunch of these thingamabobs and drop them in this dealie and see if we can't get this thing to swim like I do." The activities were in fact much like those that Eric Erickson used in play therapy. When children became defensive and guarded during standard therapeutic approaches Erickson introduced them to play. Almost at once they treated the play as a metaphor for life. *Then* Erickson focused on their metaphoric roles (Erickson 1963, p. 229).

Finding that children very often, when entering a problem sequence, tended to resort to metaphor and to plowing through their previous experience for tentative guidelines as to where to go, the only thing that we could conclude was that, given their choice, these younger children tended to prefer metaphoric modes for beginning problem solutions rather than logical and rational modes. However, we also found that when the trust environment was disrupted by aggressive teacher questioning, or by hostile observers, the children generally tended to abandon the metaphoric mode of problem solution at the very outset of the sequence. Instead, they would immediately try to be rational and linear, thus paralleling, in reverse order, the findings of Erickson.

Left-lobe Prejudices

At first this focus on linear, rational approaches was taken as an indication of "good" teaching and of a "good" instructional strategy. Later we came to realize intuitively that this was not the case at all. In fact, what was actually happening was that the children were responding to the extrinsic presence of an adult authority figure. They assumed that what the authority figure really wanted was rationality and logic and thus began describing a mode of problem solution that was consistent with what they perceived to be the expectations of the adult. Such behavior was remarkably in line with what Allport found to be traits exhibited by people who were the victims of prejudice (Allport 1954, Ch. 9). Generalizing to everyday classroom behavior, it would be tempting to conclude that a large percentage of school children spend a large percentage of time coping with the ecology of prejudice. The basis for this prejudice is the adult world's bias toward left cerebral hemisphere functions. Without trying to confuse the issue it must be remembered that the human brain is crosswired to opposite sides of the body. What we called "left-handed" knowing in 1962 was what is referred to now as right hemisphere knowing. Right-handed strategies refer to left cerebral functions. Only tentative linkage of all of these constructs was accomplished at the time with regard to our observation of student problem-solving behavior (Samples 1968).

On the basis of descriptions of what the children actually seemed to be doing during the early part of the problem-solving sequence we can assume they were engaging in right cerebral hemisphere activities and sampling the informal and tacit base of their own experience. Later on in the activities they would shift to a left hemisphere mode of thinking and look for specifics and concrete data from the manipulation of the materials at hand. This manipulation then provided them with insights which immediately allowed them to drop back into the informal metaphoric modes of thinking again, only to get a new insight which they would go back and test on the material. Shifting back and forth increased in frequency as the learning sequence went on. Eventually, however, so much linear, rational data had been gathered about the nature of and the potential solutions for the problem, that the students found it increasingly difficult to become more metaphoric. The result was that toward the end of any learning sequence they got very rational, very linear, and stuck to the routine until eventually the solution was inevitable.

Recalling that I emphasized that this was a high trust environment and that students that were working with us tended to feel completely free to do anything they wanted, I believe two points are worth mentioning: First, as the students got closer and closer to a more structured, more linear solution to the problem, it was more difficult for them to initiate metaphoric and intuitive thinking, as the problem itself seemed to reach a culmination and climax. Second, in ordinary circumstances represented by daily classroom environment the students were, for the most part, in the presence of teachers who had not established the level of trust that existed between them and the observer/developers of these science approaches.

As a result, there was a social tendency for the students to become more rational and more linear because their own experiences with their regular teachers led them to perceive that this was what was expected of them. Using just the difference between the rational and metaphoric ways of solving problems as our matrix, our immediate insights led us to aspire to create instructional experiences so that the students could essentially spend equal time at the beginning and at the end of the learning sequences in both metaphoric and rational thinking.

The differences in the modes of knowing were simply seen as styles of expressing exploration and understanding about an involvement with the unknown. We felt little compulsion at the time to differentiate and isolate one way of knowing into a tangible expression any more than the other. However, the years following were destined to do otherwise. The work of Piaget (1970) and later the work of Bruner (1966) and other learning theorists came to be focused on creating verifiable research models for education and psychology for describing learning. This focus tended to dominate the scene for many years. As a result, even though the preferences for both modes of knowing are certainly deeply embedded in the personal styles of both Piaget and Bruner, the emphasis of their publications had to do primarily with the functions of the left cerebral hemisphere. A whole decade of emphasis on the cognitive domain emerged. Research models, theoretical structures, and assessment instruments all began to reflect strongly the functions of the left cerebral hemisphere as exemplified by what was called the cognitive domain (Bloom *et al.*, 1956). A leader in this effort was Benjamin Bloom, a psychologist at the University of Chicago. Children began to be assessed on their skills with the performance of rational, logical, internally consistent schemes of reasoning. Naturally mathematics and science were the best media through which rationality could be communicated. Logical reasoning, a typically left cerebral way of performing, became the core of Piaget's hierarchies of intellectual development. Curricula were created, teachers were trained or re-trained, evaluation devices were devised, and graduate schools of education and psychology became active in responding to the growing marketplace for research responsibility in the public educational systems.

When attempting to describe the functions of either the left or the right cerebral hemisphere, it is far easier to deal with the functions of the left—not necessarily in terms of origins or in terms of complexity, but primarily because of the nature of the visible cues. For instance, in regard to language, linear reasoning, arithmetic, and mathematics, the functions of the left cerebral hemisphere are far more accessible to tangible, external assessment and evaluation. The right cerebral hemisphere, on the other hand, working with metaphoric, intuitive, figural, and analogic modes of reasoning, obviously capable of handling multiple variables simultaneously, is far more elusive. When the educational pragmatists discovered a higher level of efficiency for dealing with the functions of the left cerebral or cognitive hemisphere a detour emerged that took educators' attention away from intuitive, metaphoric, and inventive capacities of the mind.

Dreams

In the years since, in trying to create rational arguments for the legitimacy of the functions of the right cerebral hemisphere and of the educational access routes to it, I have been faced with a variety of social and personal frustrations. For instance, once in Phoenix, Arizona, when talking with an engineer who had an incredible number of patents and inventions to his credit, I was struck by the tenacity with which he insisted that all of his inventions and all of his creations were the products of hard-core, rational thinking. I tried every ploy in my repertoire to try to find out what his style of creating was. All failed until suddenly there emerged an idle comment about dreaming. This immediately initiated in the engineer a long discourse about how useful his dreams were and how very often he would solve his problems in his dreams and then wake up and in a moment's reflection come up with the solution.

Human dreaming is probably one of the better known examples of the functions of the right cerebral hemisphere (Jung 1964, Jones 1970, Faraday 1973). First of all, it operates with an incredible degree of visualness; thus its figural imagery is perfectly consistent with the known functions of the right cerebral hemisphere. In addition to this, the very nature of dreaming includes processing incredible numbers of variables simultaneously. Some of these are available to the dreamer through visual senses, some through auditory senses, some through olfactory and tactile senses. With all of these levels of excitement and involvement working simultaneously, the dreamer is literally involving himself in a right cerebral hemisphere carnival. Thus the engineer who spent so much time vigorously denying any involvement of intuitive or metaphoric functioning was, in fact, simply another victim of the social system within which we live. The intuitive and metaphoric mind functions are so often ridiculed that when they actually do begin to function there is a powerful prejudice against them. This prejudice is particularly expressed against children and, in adults, against human females through demeaning references to "women's intuition."

From Left to Right

In 1968 I began a course of investigation encouraged by Richard Jones (Jones 1968, p. 174), who had long been a champion for specific psychological functions of the right cerebral hemisphere. His criticism of the overemphasis on cognitive psychology is a classic in the field. With a colleague, Dorothy Curtis, I set about trying to get instructional strategies and tactics into public school classrooms that would nurture the functions of the right cerebral hemisphere. At the core of this attempt was the belief, learned earlier with the elementary children, that the access route was through the creation of trust environments. Our first attempts at approaching this task were aimed at trying to determine the role of positive self concept in establishing trust. It should be made clear that the trust environments we were interested in were related to emotional and intellectual climates in which the *students'* expectations were at least as important as those of the *teachers*. This differed remarkably from the instructional climates based primarily on an emphasis on cognitive or left cerebral functions. *Cognitive or left hemisphere psychological strategies inherently lend themselves to externalization of expectation. Thus the external nature of these strategies*

results in a lower potential for developing self concept than do the more metaphoric intuitive functions of the right cerebral hemisphere which are more internalized.

Our work was clear. We had to explore how the psychological climates created by emphasis on left cerebral functioning and right cerebral functioning affected what happened in classroom settings. As we began this there were two areas that seemed to be of most concern to us. First, they had to do with self esteem and the factors related to its development. Second, what kinds of instructional strategies and tactics could increase the right cerebral involvement in classrooms? A year's worth of work in schools simply exploring these ideas and trying to develop an awareness of the natural history of some of the things explored earlier, in terms of metaphoric and rational strategies, seemed to be a good place to start. We began working with inner-city students. The school we chose was about 70 percent black in an older section of Denver. After several weeks of work we compared our notes. The results of the exploration were clear as therapeutic data though not as research data.

We had determined to our satisfaction that when a normal or natural legitimacy to right cerebral functioning was part of the classroom ecology that self esteem was served. This was consistent with the findings of Coleman (1966) and Jones (1968, p. 55) whose approaches typified investigation in research modes and therapeutic modes respectively. The seeds of ideas planted in my experience by Richard Jones a half dozen years earlier were beginning to take root. It was clear that education was lacking a therapeutic or subjective model of assessment. This model was, indeed, more aligned with right cerebral functions than with the left. The prevailing trend in both education and psychology was to celebrate the cognitive and the more objective premises upon which it was founded. But at least to us a promising landscape spread beyond the door we had cracked open.

Natural and Contrived Responses

We gained enough insight with this experience to know that there were certain areas that required more study. Our work had essentially been as natural historians. We created situations in which the students and teachers could respond in a *natural* fashion as opposed to a contrived or predetermined fashion. The importance of natural vs. predetermined cannot be overemphasized. One vital characteristic of therapy is that therapists who attempt to fit a client into a psychoanalytic mold are far less successful than those who modify the theory to fit the client (Rogers 1961). The work of O. J. Harvey (unpublished) indicates that, in terms of objectively determined criteria related to personality, fourth grade (nine year old) students are as accurate as trained psychological observers in determining the core personality traits of teachers.

What this meant in our work was that contrivance was incredibly transparent to students. It mattered little whether the contrivance was (in the student's opinion) related to the right *or* left cerebral hemisphere. Work I have done in conducting therapeutic interviews with elementary students who were exposed to highly "cognitive" or left cerebral process courses indicated that seven year old children were "savvy" at psyching out the payoff responses that raised the gleam in the teacher's eye. Recent findings tend to corroborate that children are as effective at behavior modification strategies as are teachers (Gray *et al.* 1974). This "savvy" tends to fool many researchers and curriculum designers into believing their contrivances are effective when measured "objectively." A simple series of high trust therapeutic interviews would set the record straight, but this approach has low educational currency at this time.

Lawrence Kohlberg (1971) at Harvard has established an elegant hierarchy of maturation in value postures that parallels, by design, the logical hierarchies that Piaget developed for intellectual maturity. Since the models are identical, though the content is different, I would predict that as the theoretical wares are peddled on the educational marketplace low trust environments will cause students to treat Kohlberg's hierarchies as external expectations, as was the case with Piaget's. This prediction, only verified by a few dozen therapeutic interviews on my part, is not inherent in the theoretical premises of either Kohlberg or Piaget but rather in the pragmatic premise of the educational marketplace as it *uses* their ideas.

A Right-brain Project

In 1969 a grant was made to my colleagues and me by the National Science Foundation for developing a program entitled "Environmental Studies for Urban Youth." This was the first of four successive grants that allowed us to develop instructional materials, strategies, and tactics which implicitly focused on enhancement of right cerebral hemisphere functions and clarification of the relationships that these had with left cerebral hemisphere functions.

Over the period of four and a half years of development and testing in most of the major cities in the country, a variety of awarenesses emerged (Griffith *et al.* 1972, p. 1). The list following relates our findings specifically to cerebral hemisphere functions.

1. When educational ecologies were created in which the functions of the right cerebral hemisphere were celebrated and enhanced, the student's self image increased.
2. The performance of skills typically assigned to the left cerebral hemisphere also increased.
3. Students explored greater numbers of content areas and to greater depth in such instructional ecologies than they had in previous experiences (Lepper 1973, p. 4).

Because of the therapeutic nature of our evaluation procedures, extensive literature searches were made in an attempt to find out if assessment approaches had been made that tended to corroborate our findings. We had to seek out studies that used statistically valid experimental procedures to be able to determine the basis for the results and conclusions which they drew. In doing so more than enough substantiation was found (Lepper 1975); among the more significant were many of the conclusions drawn in the Coleman report (Cole-

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man 1966). One result particularly consistent with our findings was the statement that indicated that the single most important variable in terms of determining success in school was the student's feeling of the degree of control over his own destiny. However, to many not having this control, an ecology was created in which classic schizophrenic-inducing double binds were common (Bateson 1972, p. 261; Watzlawick 1967, p. 51).

Emerging from our developmental and assessment work was a growing awareness that many of the students with whom we affiliated in inner-city schools seemed to be operating at value levels that were sometimes in conflict with those of the teachers. This differentiation seemed to go beyond simply the racial differentiation often found between the inner-city students and the teachers. It actually seemed more linked to a class differential. The urban students developed individual capacity for survival and awareness of the incredible number of intertwining variables in the everyday world, which created a demand for expertise in intuitive functioning. They tried to build a base of comfort for using that expertise (Scott 1972, p. 13).

The materials developed through the Environmental Studies for Urban Youth project tended to address this student expertise vs. teacher expertise problem directly. The instructional materials were specifically designed to legitimize student access to their own right cerebral hemisphere functions. The assignments were highly ambiguous, to heighten the student's role in deciding what the assignment meant (Essence 1 & 2 1974). Students were asked to make decisions; they were asked to set up strategies and plans involving the nature of the initial problem. They were effectively invited to invent solutions for problems posed by the materials, plans that they could effectively take action on in their own environments, environments in which they possessed the "street smart." It was the commonplace world of the student that was designed to provide the content as opposed to the contrived world of the curriculum maker or the teacher. In doing this the teaching and learning environment not only created a legitimacy for the right cerebral hemisphere but it also created access routes to it.

How it worked was simple. In the face of an ambiguous assignment such as "Go outside and find a million of something and prove it" the students made a broad spectrum of decisions. They ranged from What does the teacher want?, What's a million?, How do I "prove" it?, to How do I count the bricks in the school building? The point was that such assignments tend to nurture the establishment of trust far more effectively than assignments in which *the* answer is known. The students learn quickly that diversity is appropriate, that there are many answers, proofs, and methods. They learn that it is also appropriate to "trick" the system in that ambiguity can be answered with ambiguity, specificity, or a combination of both. In effect we celebrated the right cerebral hemisphere *and* the left. There was neither penalty nor praise for focusing on one or the other. Action became its own reward.

Because the right cerebral hemisphere functions with extreme competence in the area of figural and visual imagery, we have put together a sequence of learning activities and experiences that combine both visual imagery and combinatorial play. By combinatorial play I mean to refer primarily to one of the divergent production functions of the right cerebral hemisphere which results in the simultaneous processing of multiple variables.

The Four Levels of Analogy

A typical sequence of our project activities might be an excursion through four levels of analogy as first identified by W. J. J. Gordon in his book *Synectics* (1961, p. 37). These levels of analogy are: fantasy, personal, direct, and symbolic.

The first category is fantasy. In this form the mind creates objects, entities, and processes that never have existed. Imagery and metaphoric relationships blend in a totally invented mindscape of thoughts. Contexts and contents overlap, merge, and diverge. It is generally "all new" as a process for each individual, and such mind work likewise creates products that are new in the experience of the person using fantasy analogy. In some rare instances it may result in the level of creative invention that creates a new level of awareness for humankind.

The second, personal analogy is one in which the human being involved in the analogic processes identifies the total essence of self with the process of being of the object with which the analogy is being made. For instance: A child performing a personal analogy would tend to slip into the metaphor of *becoming* a ball when confronted with a ball. The child would begin to feel and sense and anticipate the way that the ball would operate as it rolls around. The child would identify with the ball as the ball is being picked up or thrown, or struck with a bat. The total intellectual, emotional, and sensual qualities identified with the ball would be experienced by the child. Therefore, personal analogy tends to involve high levels of identification, a deep, abiding involvement in processes or entities. There is no detachment, no comparison, there is simply total immersion and involvement.

The third level is the direct analogy. In direct analogy certain processes or entities are compared with certain other processes or entities which ordinarily seem distant, remote, or alien to the initial comparison. However, as direct analogies are explored, higher levels of relationship tend to emerge. As these levels of relationship emerge, new insights into the original characteristics are achieved. An example of this would be: A city is like a heart. It has one pulsebeat per day, in the morning, when it opens up and all of the corpuscles called automobiles come flowing down the venous pathways called freeways into the city. Then at night it contracts, sends them all scurrying down arteries to their homes again. Comparing the city and the heart, two entities engaged in specific kinds of processes, creates higher levels of insight and higher levels of awareness about the functions of both. This is the function of direct analogy.

The fourth and most formal level of analogic reasoning is the symbolic analogy and other non-pictorial symbol use. This is the normal, everyday process involved in language. When a symbolic analog is used a particular

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It would be like a psychologist taking a whole spectrum of experiences and tucking them into a single label which eventually might become a school of thought such as Gestalt, or a mathematician defining gravity as

$$f = G\frac{(m_1 \times m_2)}{r^2}$$

Working through all these levels of analogic processes, we found high levels of success both in creating an attitude toward the appropriateness of right cerebral hemisphere functions in problem solving and in carrying on everyday mental processes. However it is my suspicion that higher levels of right cerebral function are related more to fantasy and personal analogs and less to direct and symbolic analogs. Thus Gordon may have created a hierarchy of metaphoric, intuitive functioning. We are now exploring the relationships between the right cerebral fantasy and personal analogistic mind work and the better known left cerebral hemisphere direct and symbolic processes described by Piaget (1970).

Applications

Our work has actually been carried out in a variety of professional areas. We have induced right cerebral enhancement at all levels of instruction in public school classrooms, as well as with industrial counseling and group and individual therapy (Samples and Wohlford 1973, p. 6). We found in a variety of situations that the functioning of a group is destroyed when individuals in the group feel as though they are not allowed to communicate things that are intuitively and metaphorically meaningful to them. It does not matter whether we're dealing with a corporate vice president and a middle level management person, with a teacher and a student, with a husband and wife, with two lovers, or with parents and children. Very often the sorts of things that tend to destroy productive relationships are exactly those things which tend to limit the creativity found in any of these groups; limiting creativity tends to denigrate or at least demean the concept of right cerebral hemisphere functioning. Intuition is cast in a lesser role than is logic (Samples 1967). Feelings are demeaned in favor of facts.

The relationship between individuals within a system, whether that system be one to one, one to two, or one to many, tends to become counter-productive whenever the individual qualities of creativeness and intuitiveness are excluded from the environment. The exclusion of these elements tends not only to affect the working relationship between the people but also the effectiveness and efficiency toward goal achievement as agreed upon by the group. For example: If a faculty in a school is interested in creating a constantly evolving, instantly modifiable mechanism for working together as a faculty, the effectiveness of this plan is destroyed as soon as logical justification and rational legitimacy are required for all of the actions of the group. The only way such a group, intent on producing creative environment, can function and sustain itself is to develop a legitimacy for and a positive attitude toward the right cerebral hemisphere functions.

My focus over the past several years has increasingly been to focus on motivational analysis and motivational therapy as opposed to behavioral analysis and behavioral therapy. Because behavior is patently obvious in any group, we find that little headway is gained by doing a rational analysis of behavior and a rational analysis of modification of behavior (Samples and Wohlford 1973). Instead, what we deal with are primarily the motivations that lead to that behavior. In doing so, we find that motivation seems to be a quality of human mentation that is primarily focused in the right cerebral hemisphere.

Although this sounds like heresy, it is my conclusion that an overwhelming majority of human decisions are made in the intuitive, metaphoric right cerebral hemisphere. They are then explained in the rational, logical, left cerebral hemisphere. Yet quite the opposite image of human mental involvement is the popular image. Therefore my approach is effectively to legitimize the right cerebral hemisphere function, to legitimize the intuitive, to legitimize the metaphoric, and in fact to build levels of maturity in metaphoric and analogic processes (Samples 1967).

In doing this I feel as though we are creating a broader base for an acceptance of and a maturity in the intuitive side of human mental processes. There is little new about this strategy. Therapists and counselors have been doing it for generations. However, with the physical and psychological constructs provided us by Ornstein (1972) and others for the differentiation of function of the cerebral hemispheres, all that we are doing is weaving adequate and competent therapeutic practices into a context that tends not to denigrate any part of the human mental capacity but instead to celebrate the union of both.

Right and Left: Equality and Synthesis

None of the work that we have done has been aimed toward demeaning the rational, linear components of human mentality. Instead, it has been to celebrate those but to celebrate them as part of the *complete* portrait of human intellectuality, emotionality, and sexuality. Divergence to us is as important as convergence. It is not as though one can exist without the other, but a predilection toward convergence tends to diminish the opportunity for many people, when using their mind as an inventive tool, to explore the roots that are made available by divergent thinking.

Abraham Maslow (1971, p. 73) talked often about self-actualization and about reaching the full potential of the human being. One of the things that I have concluded is very similar to a conclusion that Maslow reached shortly before his death. He opined that perhaps the peak experience of human creativity is not terribly different from the peak experience of actualization. As a result, all that we are doing in terms of work that is both analytic and thereapeutic is to try to create attitude and access routes toward higher levels of total integration of mental capacities. As a result, I hope to witness an increase in the occurrence of peak experiences, with such an increase becoming a normal pattern for human beings as they live their lives.

DISCUSSION

Visual Imagery: Metaphor versus Rationality

Nancy Bauer: You put a lot of emphasis on the use of visual imagery. Do you have any observations or any research on what happens when you use visual imagery with children?

Samples: Sure. One of the things we have learned is that children generally have higher levels of metaphoric maturity than adults. They simply do not have the rational maturity. Some people that I am working with are actually convinced that children can see auras, that infants can actually see energy fields that surround your body. One of the things we say is, "Oh, their eyes are not focusing yet."

The qualities of metaphoric thinking that children are capable of are quite profound.

Bauer: I understand the importance of that, if your goal is more metaphoric thinking but what if your goal is to encourage or enhance vicarious experiences, such as experience of Sumaria or Iraq. Teachers often try to give kids empathy, a sense of what other people or cultures are like. Do visual images help with this?

Samples: I have no control over how students process visual images, and so I am forcing them, in the act of looking at a particular picture, to exercise the functions of both cerebral hemispheres. The visualness primarily appears to the right hemisphere and the words to the left, but I cannot control what happens.

Bauer: Oh, no, I think you have built your control up because you have imposed your metaphor on the students.

Samples: I am not too worried about that, since about 90 percent of the materials now used are in the left hemisphere mode.

Bauer: There are two things that concern me. One is that you are not interested in the use of visuals for vicarious learning—for example, learning about places children have never been, and flowers they have never seen. This seems to me to be an important use of pictures.

The other thing is the possible application of what you have done to my effort to create, if you like, right-minded approaches to the culture of foreigners. In what ways can you arrange the study of Russia so you understand and empathize with the Russians? At what age would you expect empathy to result? We talk about all of these goals in social studies.

Samples: I share your concerns, but I also have a built-in resistance to them. Maybe that is what is making me awkward in answering. I get a little bit worried when I use a visual mode and try to generate metaphoric experience specifically *for* rational knowing. I have found that almost all instructional materials do that a lot. They will let you play with the picture, but for a rational purpose. I want to legitimize the metaphoric awareness *in and of itself* so that little kids do not paint a picture so they can write a story about it. They can paint a picture to paint a picture. I am really against using the metaphoric strategies to seduce the kids into more rational knowing.

Bauer: I understand and agree with that goal as a worthwhile thing. But we still have the responsibility for the vicarious learning of students about many things.

James Eckenrod: I hear Nancy asking about her efforts to transmit knowledge, where the outcome expected of the children is an understanding of a foreign culture. My understanding of what Bob is talking about is how we help young children construct their own realities. If we expect them, at the end, to have your reality of what Soviet life is about, we expect the impossible.

The best way we can do it is to provide rich, personal, active experiences for kids and hope that someday maybe they can get to the Soviet Union and learn what it is like to be alive in Russia. The intended outcomes are wrong if we expect them to recite data about the Soviet Union.

Bauer: I am still concerned about empathy and understanding. We always say we want students to study Russia so they will understand the Russians.

The Metaphoric Capabilities of Children

Stanely Wronski: You stated that children are able to handle the metaphoric operation better than adults. You also said that you had tested this idea. In view of your reluctance to test children, how did you get evidence on this?

Samples: We counted the number of alternatives kids would try in entering a problem sequence, then did the same thing sometime later. We found that they would increase remarkably the number of alternatives that they would try when we used metaphoric strategies. They would actually get more linear—fewer alternatives would be considered—when we used rational strategies. It is just as simple as that.

Wronski: Do you have any comparable kind of testing of adults?

Samples: Yes. We analyze tape recordings of the beginning and ending of a series of sessions. We turn on a tape recorder in a roomful of 40 people, start talking about something, and analyze the quality of the responses, most of which are limiting, separational, and convergent. Then we work together thorugh metaphoric sequences, and at the end the people are being very holistic and divergent in their strategies for solving problems.

Wronski: If this is so, then our problem becomes more and more difficult as children become older.

Samples: Yes. That is really the point. For instance, I can walk into any kindergarten class and deal with any concept in any way they want to. At the senior high school down the street, I have to warm them up for three days.

Richard Jones: An interesting aspect of dreams that I did not mention is that when we are asleep, children and adults, we are equal. The training-out of metaphorical thinking that Bob was talking about does not apply while we are asleep. That seems to be safeguarded against culture.

Samples: One other thing I would like to mention about the child's way of knowing. David Elkin, when I first met him, was at the University of Denver and I was working for the state department of education. He came in and said, "You are an earth scientist. Tell me how to teach children about lakes." He said he asked this little kid, "How do you think lakes form?" And the kid said, "There is this giant and he walks around and he leaves big footprints and rain comes in and fills them. This is where all the lakes come from."

So Elkin got a nine-foot stream table, with mountains, thunderstorms, hurricanes, and the whole bit. He worked with this kid in a tutorial one-to-one way for something like six weeks—not full-time, but each day—until the kid knew how to explain tarns, oxbow lakes, and so on. This was during the summer session.

The next year, the kid came back and Elkin said, "Hey, I remember you." The kid said, "Yeah, I remember you, too." Elkin asked "How do lakes form?" And the child said, "Well, there is this giant, and he walks around. . . ."

James Eckenrod: We had some similar experiences when we were setting up our curriculum. We observed some kids during an experiment with gases, a concrete experience in which they can manipulate and see what the operant variables are and arrive at a conclusion. Often they would not get the cylinder on the clay right and the water would leak, or something else would happen. We probed their understanding and it was this: "Sometimes it works and sometimes it doesn't." That was their real understanding. We wrote a paper about that and called it "Can You Accept a Child's Answer?" Generally, adults and educators cannot accept a child's answer.

Acceptance

Jack Fraenkel: Should you accept a kid's answer—any answer that a kid offers?

Samples: I have no choice but to accept a kid's answer, but it does not mean that I necessarily *agree* with it. I cannot defend this; it is just my style. It works for me. The metaphor that I use for this is some experience that I gained in working with Navajo people. Acceptance is an incredibly widely practiced custom in many of the Native American cultures, particularly among Navajos. If you say something to me, the thing I must do, as a cultural strategy, is to accept it. Then I can respond to you about whether or not I agree.

When we work with teachers, we try to get them into postures of accepting, but not necessarily agreeing.

Fraenkel: What do you mean when you say accept? Saying I hear you and I understand what you are saying, that kind of response?

Samples: Yes, just listening instead of commenting on it. Learning how to just really accept what the kids do and then go on to say, "I do not think I can cope with that because I am afraid to think that way," or something of that sort. You have to say it very honestly, and speak in the first person. If we get teachers to do that for a week in school, it changes their teaching strategy forever.

Fraenkel: That is so frightening to people. Would you advocate, assuming we had such people, that they encourage kids to accept their own answers?

Samples: Yes, but not necessarily agree with them. Very often it is a matter of exaggeration. I accept the notion that children exaggerate in my presence. When I accept them and celebrate that exaggeration, there will be a time when exaggeration is not necessary and they will come back to me in a very straightforward way. But to first legitimize their responses is the quality of instruction that I emphasize and value.

Release and Play

Suzanne Helburn: Bob, in line with some of your comments, it sounds as though metaphoric thinking involves breaking down barriers.

Samples: Most of the stuff we have been doing with teachers has shown that what we are dealing with is an attitude. Everybody thinks metaphorically, and it is always going on. But, somehow it is missed or ignored. All we need to do is legitimize it.

Let me give you an example of counseling we have done with some women's groups. Women who have been quickly promoted into positions that were formerly held by men have a peculiar kind of a crisis that they go through because, and I know that this is going to sound sexist, women are culturally rewarded for being more metaphoric and more intuitive. As a result, when suddenly thrust into the male aggressive kind of role they try to "out-rational" males. They try to be more rational than the rational males that would normally have taken that job. At that point, we say to the women, "Do not do it," "Do not play that game."

We find that a lot of elementary school teachers are very metaphoric and very intuitive in the role they play in teaching. But the secondary school people have an academic major, and they believe that major is a serious matter, and often they think about it that way, and so they tend to develop an attitude that reflects what they see as a more "profound" kind of rationality. At that point, we simply invite them to entertain the notion that it is okay to be playful. Most of the really cool people never work hard. They play all the time. So attitudinally we give these teachers activities and let them discover that they can survive being metaphoric in each other's presence.

Bauer: I would not equate the word playfulness, which is sort of an expansive style of experience, with the ability to create metaphors. Maybe it is just a semantic bind, but I think that the word metaphor means that you have to have two related experiences; some people can put such experiences together. Thoreau was great at it, but I am not sure every four year old is. You have to have both experiences first.

Samples: Well, Nancy, I treat "metaphor" as a verb. By metaphoring, I mean to get involved deeply into combinatorial play. Thus if there are no appropriate combinations for which I can find a counterpart in my experience, I invent them. That is the strategy that I am talking about. As a result, I am never confined by my own ignorance.

Are Right and Left Lobes Really Differentiated?

Irving Morrissett: Bob, evidently you and a number of people believe that the evidence is quite good for a very large separation of functions between the cerebral hemispheres. I take it that there are many physiologists who say the evidence is not very good and you are off in left field. Is that right?

Samples: Some say that I just happen to be hanging around the people that do not say that right now.

Morrissett: Well, my question is: how necessary to what you want to get done is evidence of this separation? What you are concerned with, and what the conference is concerned with, is two modes of thinking. Whether or not those are related to parts of the brain is not a bit essential to the existence of the fact of the two modalities. My question is, aren't you unnecessarily getting resistance when you talk as though your basis of operation depends upon physiological evidence, which it really does not.

Samples: I do not find very much resistance to it, mostly because it is so compatible with the technological capacity of the culture we are in. Such an approach is a very political one in the sense that most of the people with whom I have worked in education seem highly frustrated by the lack of a model—so much so that unless we can talk cognitive, affective, and psychomotor, communication tends to break down.

So I emphasize cerebral functioning simply because I am interested in it, and also because there are technological compatibilities with people who are systems thinkers. I do not give a damn if the hemispheres are differentiated. But the people with whom I have had an opportunity to talk including Ornstein and Galin, think this way. They are very convincing to me about the validity of the separation; but I do not care. My adherence to it is just to create a model that can be communicated to people who like models.

Should the Teacher Know the Answer?

Alfred Kuhn: You referred to asking questions to which the teacher did not know the answers. I recall a suggestion that a teacher should *never* ask a question to which the teachers knows the answer. I wonder if you have any particular feeling about that.

Samples: Once the kids know that you are *not* trying to trick them into a particular way of knowing, it does not matter whether you know the answer. But, if I do know the answer at the beginning, it is awfully hard work for me not to lead you to my answer instead of allowing you the freedom to explore on your own. In the face of ambiguity, human beings have to make decisions. In the face of specificity, all they have to do is perform.

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CHAPTER 7

CONFLUENT EDUCATION

Mark Phillips

Mark Phillips explains here the meaning of confluent education. Confluent education can be thought of as an extension into detailed practice of the notion of trust set forth in the paper by Samples. Phillips has examined the idea in action, and closely, over several years. The idea of confluent education goes beyond the earlier ideas about healthy classroom climate, which had been current since the thirties. It seeks a specific awareness among the members of a class, including the teacher, of the feelings that are being communicated, overtly and covertly. In this, it reminds us of the comments along these lines by Lippitt and Schindler-Rainman.

Like Lippitt and Schindler-Rainman, Phillips has a vision of what people should do and be, if they are to realize themselves fully in a trusting, just society. He shares with his colleagues the feeling of missionary zeal, though he comments during the discussion after his paper that he uses conservative, ''safe'' strategies to bring about what would ultimately be radical reforms.

The development of confluent education is presented as the growth of ideas in practice. Having made substantial progress in developing individual awareness and participation, Phillips and his colleagues have more recently been giving greater attention to the social context within which they do their work.

I want to share with you some of what we are doing in the confluent education program at the University of California at Santa Barbara. This is a small effort which we are finding hopeful, and I am looking forward to sharing it with you.

I will define and talk about curriculum in a broad sense, including the *written curriculum*, but with emphasis on the *emergent curriculum*—how one deals with written curriculum in the classroom in relation to what is happening to a group of students at a particular point in time. I will also deal with the *hidden curriculum*.

First I want to rap for a while. Then I want to do an experimental thing, although this will be an insufficient sample of the exercises that have been used in our program with students. Then I want to talk further, tying that experience into a broader concept of what we are doing and where we are moving. Finally,

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I would like to have as much of an open rap session as possible.

The Hidden Curriculum

The nature of the context is very important to the outcome. The nature of the means that are used in the classroom helps to determine the ends. How a written piece of curriculum is taught may be as important, more important, than the specified objectives in the curriculum: how the teacher behaves, how the group interacts, the nature of that environment within the classroom itself.

One of the things that I noticed about this conference, one of the more refreshing conferences that I have been to, is that there is a "star" system of sorts—there are "stars," "experts," brought in from the outside. I am not denigrating that, but the conference in some ways pivots around the presentations of these "stars." That is important in helping to determine what happens. It is somewhat *authority* centered.

I am aware, for instance, that there are no high school students here. I am not suggesting there necessarily should be, but the fact that there aren't, as we talk about what should be going on in schools, makes a difference. It could be assumed that we have enough knowledge of schools to represent those students. I don't necessarily agree with that assumption and I am not suggesting that others necessarily do either. It does seem to me that these characteristics of our context will help shape the outcomes of the conference.

Planning for Others

I have been reading a book by Peter Berger, *Pyramids of Sacrifices* (1964, pp. 133-36), in which he takes on socialism and capitalism. In one of his "interludes" he describes an imaginary international conference which focused on "third world" under-developed nations. The people there were well-dressed, upper middle-class experts; the poor people of the third world were not there. At one point in the conference somebody made an impassioned statement concerning the importance of being concerned with the well-being of these people. He noted that there were third world people living right here in the hotel where the conference was being held and nobody was concerned with them. Conference participants were leaving their food outside the door to be picked up in the morning and their shoes to be shined. (If I left my shoes outside the door in New York, I think they would be gone by the morning!)

So they reached a resolution, a major debate that took about three hours. They weren't going to leave the stuff outside the door. Mr. Berger makes the point that the people being affected were not consulted. It was a typical helping relationship. What that action did was to throw off the whole system. The hotel service people didn't know how to deal with it. They felt it was a personal affront. Berger points out that no dessert was served the next two nights and he wasn't sure whether that related to the particular action or not. Who was included in making decisions for whom? What is the nature of the decision-making process?

Another image sticks with me. Just recently I saw the movie *Young Fran-*

kenstein. It had a great scene in which the monster goes around the village and stumbles into the home of a blind man, played by Gene Hackman. The blind man only wants to help the monster but ends up spilling hot soup in his lap and the monster leaps up in extreme agony. Then he tries to light the monster's cigarette but instead lights up one of his fingers. There is one image of the *helping relationship*!

A third image in my mind is from an article by Benjamin DeMott (1975) in a recent issue of *Harper's*, entitled "Hot-Air Meeting," which deals with a meeting that was held at Southampton College, Southampton, New York, about a year ago, supported by grants from the U.S. Office of Education. They brought in a host of people, including Lillian Hellman, John Brademas, Robert Quie, and Senator Clayburn Pell, to deal with the problems of American education.

DeMott comments on some of the failures of the conference. He indicates that one of the errors was the fallacy of believing "that the doers of the world, the improvers, the nonprovincial, the well-traveled, the experienced, cannot but introduce into a mixed assemblage qualities of the flexibility that teach and refine by example" (DeMott 1975, p. 79).

That was an error, that was not what happened; people got up and made impassioned pleas for their own points of view. The very lacks that people were talking about in education were being demonstrated at their worst at the conference. A typical partisan plea was made by someone who said that the answer is Head Start programs and what the hell is the matter with you people that you are not putting all your funding into that.

DeMott also says, "in theory we knew that much, if not all, reformist bustle about education in the recent past has been without consequence. Open classrooms? closed? oral? aural? oral-aural? disciplinary? interdisciplinary? school? deschool? field? stream?—increasingly these battles seemed weightless. Knowing these things, we therefore also knew—did we not? how could we not—that the 'cure' for, say, corruption in high legal circles is not a project in moral education for law schools. But this was among our proposals—and it could soundly be said that all the Southampton proposals were identical with this one, in that all flowed from the conviction that *we* are ready (*the others need pricking*). And all betrayed ignorance of the true grain of common feeling" (DeMott 1975, p. 83).

Confluent Education

The point is that we need to be aware of ourselves and the context of which we are doing. In making that point I am also introducing confluent education. One of the things we are trying to do is to train teachers to be aware of the way in which the contexts that they create help mold the outcomes of the students they are working with. What I am about to present is not necessarily better than what other people are doing in education. Rather, it is what we are doing with the limited resources and knowledge we have.

Confluent education began about five years ago. It grew, not out of theory, but out of the "practical." George Brown had background in creativity training, in Gestalt, and in teaching and teacher training. He and some of the other "founders" were also good teachers. How they got to be good teachers we are still not sure, but those good teachers ventured to Esalen, a growth center on the West Coast. For a period of time, they worked with Fritz Perls, founder of Gestalt therapy. They came out of this experience very much interested in applying to the classroom some of the techniques that he was using in dealing with the feelings of people.

They worked with teacher training. They got a mini-grant and then a full grant from the Ford Foundation to develop curriculum and to do teacher training, integrating into traditional curricula—social studies, English, etc.—the exercises and experiences that were drawn out of Gestalt.

One important assumption in the confluent projects was that training teachers came first and the curriculum developed out of the teacher training. Individual teachers, through the training process, developed their own curriculum. That didn't mean they couldn't use national curriculum packages or other curriculum, but those would be integrated with their experiences and developed into a curriculum of their own. The key purpose was not the design of curriculum for national dissemination, but the improvement of this limited group of teachers and the improvement of the curriculum in their classroom. At the same time, some of the curricula they developed have since been disseminated, are still available for dissemination, and are quite good. The assumption was that no curriculum is "teacher proof" and a judgment was made that it was more important to train the teachers than to develop the curriculum.

Initially, confluent education had the goal of *improving traditional achievement,* to develop processes which would facilitate the achievement of existing goals. By dealing with students' concerns related to the subject matter, by dealing with blockages to learning, by having students examine themselves and their relationship to the subject, and by developing links between students and between teachers and students, learning of basic subjects would be increased. As initially formulated, it was a humanistic extension of educational psychology, a psychological means of improving and achieving traditional goals.

There were other, implicit, goals not being made fully explicit, primarily for reasons of public relations. Schools would respond positively if we said, "All we want to do is to better achieve traditional objectives." On the other hand, if we said we were also trying to help students clarify their values, become aware of themselves, become whole persons, and develop their creative capacities and their capacities for visual thinking, more difficulty would have been experienced.

In truth, the means as well as the goals were frequently non-traditional ones. Processes being taught to students were those of self-explanation and self-examination. The nature of the classroom environment was also atypical, with close relationships between students and teachers, and teachers responding as human beings, sharing their feelings, being open and honest.

One of the things often said was that we were not doing anything different from what good teachers have done all along. I think that in some ways that is true, but the means were somewhat different and those means were and are important.

More recently, other psychological approaches have influenced our program. Psychosynthesis and transactional analysis have been integrated into the program, as well as the "self-science" approaches developed by Gerald Weinstein—approaches designed to help individuals become scientific observers of themselves.

The Wall

Now I want to do an exercise with you. If you don't want to do it, feel free not to. It is not high risk; you are not going to disclose your secrets. This is one example of what we have done with curriculum. Afterwards I want to illustrate how various people have tied this particular exercise into a curriculum.

Take a comfortable position and close your eyes. If what I am going to describe doesn't seem to "happen" for you, that's not unusual; don't feel there is something wrong with you.

Given all that, if you are willing, come with me. Close your eyes and take a couple of deep breaths; hold them as long as you can and slowly exhale. Let your body relax as much as you possibly can.

Imagine a screen in front of your eyes. Whatever images or thoughts come across the screen, don't hold on to them. Let them pass quickly.

Picture yourself on a country road, a road you would like to be on. You are all alone in beautiful surroundings. There is a cool breeze blowing. The sun is overhead and you are walking along the road. You are enjoying your walk.

Look way up ahead of you on the road. You see a wall across the middle of the road. As you look to the left and to the right along that wall you can't see the end of it. As you look towards the top, you can't see the top of the wall. It is that large.

Now, walk up to the wall. Put your hands on it. Feel it. Let whatever happens happen. Continue with that for a few minutes. Wherever it takes you, just go with that.

Now, whenever you feel ready, let that pass. Come back to the room and open your eyes. Now—and again feel free not to do it—share whatever took place with one other person. If a fantasy took place, share whatever you are willing to share from the fantasy. If nothing took place, and you want to talk about that, fine. Take a minute or two for sharing.

I am trying to model a little bit of what we do in confluent education. No one *has to* do anything. We make that a rule and bend over backwards in that direction, because the overall norm sometimes pushes people too much toward self-disclosure.

People are asked to start by working with themselves, disclosing things first to themselves and then with one other friend or somebody they can trust or feel comfortable with. What sometimes happens in the classroom, and which we want to have happen, is that the number of people one is willing to trust becomes larger over a period of time.

Fantasy and Self-Knowledge

Richard Jones talked about working with dreams. One way to move toward that, to explore the land between pure cognition and the dream state, is to have people go into fantasy when they can do it. This is difficult for some people; sensitivity and skill on the part of the teacher are important.

I did a childhood fantasy experience with a group of people in Baltimore about five years ago. There were a number of black students there with painful childhood memories. I learned then that for some people, remembering one's childhood can be destructive.

One purpose of doing a fantasy is to increase one's ability to visualize images. Richard DeMille did a book for children, *Put Your Mother On The Ceiling* (1967). He has the child visualize a rubber ball, make the rubber ball bigger than a house, make it smaller than an ant, climb on the ball and fly out the window, play with your mother, make her fly around the room, put her on the ceiling, and so forth. Besides being fun, this also helps to develop the ability to create visual imagery.

Another purpose of fantasy is self-knowledge. People respond to the wall in the fantasy very differently. The first time I did that fantasy my response told me a lot about myself. I got annoyed. I walked up and down the wall, figuring continually, how am I going to cross it? The fantasy ended and I was still walking back and forth like a character at the end of a Bergman movie, wondering where I was going.

Someone else responded to the wall by bringing in planes, tanks, and troops, like in a Cecil B. DeMille film. Others sit down next to the wall and enjoy the sun; the wall doesn't bother them; they feel there is no need to get to the other side.

In our classes we have support groups, from which people receive feedback. We may ask, "What was your response to the wall? Is there anything in your way of responding to the wall that tells you more about yourself? How do you respond to the walls in your life?" After responses are given, someone in the support group may say, "I don't perceive you responding to walls in that way." Thus, increased self-knowledge can come from the perception of others, not just from self-perception.

Experience with the wall has been related to various curriculum areas. In an English unit, someone related it to a Robert Frost poem, "Mending Wall." In a social studies unit, a Zagreb cartoon called "the Wall" and a Norman McClaren film called "Neighbors" were shown, and the class got into the whole subject of fences and walls between nations and people.

Exercises to encourage fantasy and self-exploration are plentiful in the literature. Our concern is not how to find such exercises, but how best to use them. When do you use them? With what group and in what context?

The Emergent Curriculum

Beyond written curriculum materials, our greater concern is with the *emergent curriculum*—building on awareness of ourselves and of the context of the moment. We give attention to hidden curriculum, the implicit goals and experiences and outcomes in the classroom, because we want to make them explicit and to make them a part of the emergent curriculum. In our value system it is better for people to be aware of what is happening to them than not to be aware.

Geoffrey and Smith, in a book called *The Complexities of an Urban Classroom* (1968), an ethnographic study of teacher and student classroom behavior, talk about the teacher's skill, of "ring mastership," being able to be aware at any moment in time of most of the things that are going on in the classroom. Their observation was that teachers who have this skill seem to be able to function more effectively with students than teachers who do not.

So, among our goals in teacher training are *awareness of self* and *awareness of classroom environment*.

A Gestalt assumption—but not unique to Gestalt—is that it is important to be aware of what is "mine," in order to help differentiate between what I am projecting on to my environment and what really exists. At least, what part of it is mine. I feel that my own children are sometimes victimized by the teacher's "schtick," projecting his or her problems into my child, dealing with my child as a typical child in a preconceived type of situation.

How do we train teachers to be able to pick up, not through test scores but through personal observation, where people are at a moment in time? One needed skill is reading body language. Who is with me here and who is not? What does that nodding head mean? Some students sit and nod their heads all of the time and they are sleeping! How do I make that differentiation?

How to make explicit what is implicit? More accurate ego language is one way: not to say "I" when I mean "we" and not to say "you" when I am talking about myself. For example, there is the statement "we all know," which immediately gives the individual a very strong power basis in terms of the support that he or she allegedly has.

We are also working on how to create trust in a classroom. How much trust can you expect to build? Sometimes building trust seems impossible. I have walked into classrooms where the "killer" statements are fast and furious, where the norm is to "put down" other people. It is not possible, within a period of a week or two, to change the societal norm that exists within such a community or peer group. But there are ways of beginning. People can begin by sharing what it feels like to be put down by others they trust.

One of the models we are using that comes out of Gerald Weinstein's work is "self-science" education. He calls it "The Trumpet." The individual first looks at a specific personal response. For example, after the "wall fantasy" you might have examined your response to the wall.

As another example, I do an exercise in which I ask for volunteers. I don't say for what. Finally, five people will raise their hands. Then, I will just ask people to inventory what the sentences were that went through their heads at that moment. "I wonder what the hell he wants me for." "If I put my head low enough he won't see me," etc. The next step is to determine if the response represents a pattern for you. Maybe it does, maybe it doesn't. Are you the person whose hand forever goes up or are you the person in volunteer situations who usually gets down as low as possible?

Then individuals work on what these patterns mean for themselves. What do you get out of them? There are things that we get out of being volunteers and there are things we get out of not volunteering. Then we may work in groups, getting feedback from others, experimenting in low-risk situations with alternative forms of behavior, and getting feedback on that.

The purpose of all this is to combine various ways of knowing one's self.

The Social Context

Up until the past year we focused almost entirely on the personalized dimension, and dealt very little with the broader societal context.

We are now trying to focus simultaneously on *self* and *society*. As an example, in the self-science process above, instead of just looking at one's self, at one's behavior in isolation, people look at their behavior in relationship to the social world.

As an example, somebody I know is doing marriage counseling in California. A couple of people who were with this counselor noted that the counselor was dealing with the problem as if it was purely *their problem*. There was no perspective brought into the counseling process of what the social norms are in California—the external pressures on marriage, changing male and female roles, and so forth. The counselor was dealing with the problem as if it was *purely* a problem between the two individuals. Of course the other extreme, which assumes it is all socially determined and we can do nothing about it, is equally to be avoided.

What we are trying to do is train educators to look at *themselves* within different *social contexts*, toward the goal of increased self-knowledge.

A second purpose is the process of *building community* between teachers. This has been one of the most significant outcomes from the work we have done.

A third purpose is to have the personal and community outcomes directed towards a change in the social structure itself. For example, I am becoming more committed to the educational goal of creating non-oppressive educational environments. Oppression has been defined as decisions being made for people, by other people, without the people who will be affected by the decisions being consulted or being involved in the decision-making process. We are trying to avoid such oppression in our program. We are not going to the other extreme, of turning the programs over to the students or disavowing the things we think we know; but we are including students increasingly in all decisions that affect them.

We are also trying to get out of our upper middle-class bias. We have been bringing in students who are multi-cultural and are learning a lot from them. People working in Chicano communities, for example, tell us that it is all very nice to talk about getting in touch with your feelings, but fantasy experiences are not enough in a community in which the 70 percent Chicano population is ruled by a totally white-Anglo power structure which is completely non-responsive to Chicanos.

Integration

What we are searching for is ways to integrate all these experiences and ideas. How do we take a conference like this and integrate our experiences so that it is not just me talking to you and you talking to me. How do we create a dialogue so that I learn as much from you as you learn from me? How can a classroom be conducted so that the teacher learns as much from the students as the students learn from the teacher?

DISCUSSION

The Role of Chicanos

Glenn Linden: Are most of the teachers you are working with Anglos, white?

Phillips: Yes.

Linden: How many Chicanos?

Phillips: Until the last year or so the people in our program were primarily white, upper middle-class. We weren't attracting minority students. When we received a grant from the Ford Foundation we brought in six first-rate Chicano educators. I have been doing some work in the past year in Ventura County and Oxnard with heavily Chicano populations, people who have had trouble with the law, dealing with a primarily white police force. What is happening is the word is getting out in the Chicano community that we are not just into "touch-feely" education and all of a sudden there is more interest among Chicano teachers and students.

Linden: How do the Chicanos respond? Do they really open up? I would think the level of trust that you would have to establish to begin with would be very important.

Phillips: I do not work with Chicanos by myself. I work within a team with Chicano educators. There is something wrong about me as an Anglo, with my minimal knowledge of Chicano culture and with the well-founded context of suspicion in the Chicano community, going in any other way. The Chicanos in our program came in with a definite interest in confluent education but also with some suspicion and skepticism. The program has allayed some of their skepticism, but more significantly, their presence has changed the program. Some skepticism remains, and that is a healthy thing for the program.

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Changing Goals

William Joyce: I am a little disturbed about one comment that you made. I may have misinterpreted your remark, but I think you indicated that your current activities do not directly involve changing traditional educational goals. Did I read you wrong?

Phillips: Yes. One of my personal gripes when I came into the program two and one-half years ago was that it was being called "value free." I also disagreed with the idea that we just wanted to help people reach traditional goals. In that process you take a value position which is that the present goals are okay and don't need to be changed. I disagreed with that. What I perceive we are about right now is conservative radicalism. We are committed to changing the system drastically, but we are not committed to changing the system through rapid and violent overhaul.

At present we are working with students to help develop an awareness of the social system that exists in the University—to develop social literacy to complement self-literacy. When someone asks, "What the hell is the matter with the Dean?" we look at the position of the Dean within the system. What pressures are on him? How he is evaluated by the Chancellor and the Vice-Chancellor? We also share ideas on how we can effect change. Some people who came into the program ready to batter down the walls of the Chancellor's office learned to step back, to learn about the system, and to develop the support of others. They have learned that as single individuals they are not likely to change the university but that in concert with others it is possible to bring about changes. But you have got to be socially literate to be able to do that.

My feeling about teachers in the field is that the nature of the institution works in such a way that the establishment of community support systems among teachers is next to impossible. Things are arranged in a way that keeps people as isolated as possible. The strongest need with teachers is not to learn exercises, nor even personal development. When teachers are given the time to be together and share things, they want more of that connectedness. They want and need community.

Teachers are becoming more powerful, through unionization. But what are they going to use that power for? With all their power in New York City, they have not improved the quality of education. Do teachers know how to use power? One of our concerns is having people become aware of personal power and group power, and of "power with" as opposed to "power over."

Bonny Cochran: One of the things you mentioned is something that came out of the program that you had not expected—a feeling of strength and solidarity among the teachers. Would you talk a little bit about how that happened, and especially what they do with that strength and solidarity?

Phillips: In our degree programs people come from different parts of the country and eventually disperse. In our school projects we work with people from a number of different schools. In both cases we have encouraged networks of people who build a support system through communication and travel, who can call on each other for advice and help.

Alan Tom: I have also been concerned that you seem to be taking a very conservative approach. I have been puzzled because I thought at first that it was much more radical.

Is it merely that teachers should be responsive to communities? In a few cases, that might be radical, if teachers are not currently responsive to communities.

Phillips: What we are doing is not radical in the sense of destroying present structures and substituting a grand new scheme, but it is ultimately radical. By social literacy, I mean awareness of a system which I perceive as basically oppressive, in the sense that many of the people affected are not included in decision-making processes. We are concerned with understanding society and how decisions are made, not for the purpose of accepting society, but for the purpose of identifying the best intervention points and ways of changing it.

I want a society in which whole people can develop. I want to change systems and I believe that the process of personal change and of change in those systems needs to take place together. Maybe you don't perceive that as radical.

Tom: I perceive that most of your discussion has to do with tactics or processes.

Phillips: Yes, political tactics or processes or exercises to make us more in tune with one another. What would you rather have us do?

Tom: Well, maybe it is there and I don't see it, but I think you need some kind of a vision of the future that is an end-point that all of this is designed to reach.

Phillips: I can describe a piece of the end point. I don't know if I have a final Utopian vision, but I envision a society which is neither racist nor sexist. It is a society in which, as much as possible, individuals are consulted with regard to the decisions that concern them and in which institutions exist to serve the needs of the people as opposed to serving their own needs.

I had a friend who worked as a custodian at a school in Maryland. His purpose was to see what schools look like from the perspective of the custodian. His final analysis was that the physical plant and the program were constructed more for the needs of the custodian than for the needs of the students.

Community Reactions

Thomas Ward: In the average and above-average white, middle-class communities, what are the reactions to what the teachers have done?

Phillips: The best example I can give is my daughter's school, where I sit on the parent advisory committee. My daughter has just come out of the sixth grade. She has had the best educational experiences of her life in that school, with teachers who have directly or indirectly been associated with confluent education. At this moment many parents in this school and elsewhere have a lot of suspicion, suspicion of almost anything that isn't straight, old-fashioned reading, writing, and arithmetic, done in a traditional way. They want control and discipline in the traditional sense. The principal has responded to parents with a great deal of tact while supporting the teachers.

There is a lot of opposition and yet confluent education exists and is effective

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in a number of classrooms. Individual needs and differences are being met in a variety of ways by skilled teachers. Parents haven't complained very much about that.

When humanistic educators are criticized they often respond defensively and condescendingly: "What is the matter with those stupid people out there that they are not turned on by this?" It is important for them to understand what is happening in society. There is a lack of confidence in our society. People want to grab hold of something that is familiar and concrete. Humanistic educational approaches are usually neither.

Humanistic reforms are taking place in spite of the "return to the basics" forces. The best humanistic teachers are socially literate and are able to both survive and bring about changes, teaching the basics but in more humane educational environments.

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CHAPTER 8

SYNECTICS

John Haas

In his paper, John Haas offers a full explanation of Synectics, which is a series of activities intended to bring together unlikely areas of reality in order to "make the strange familiar, and the familiar strange." We have placed this paper at the end of the series, believing that the context developed by the earlier papers will make its importance clear. Viewed in the context of the other papers included in this volume, this one clearly is intended to make real the imaginative, metaphoric, fantastic, dream-like quality of the mind as it approaches reality.

Most of the paper is devoted to a display of synectic exercises. If the reader will lend himself to the exercises, he will close this book with a sense of the actuality of what has been discussed here, having brought it to consciousness within himself. The experience of empathy, so strongly stressed in several of the other papers, becomes an actuality. The theme of trust is made real through the creation of a step-wise excursion. The vision of the human condition, which is implicit in the book as a whole, is also expressed and implied in this paper. If the reader has given himself to this series of papers and discussions, the paper by Haas should function to persuade us that when we explore the fantastic, the dream-like, the metaphoric, the intuitive, we have brought to awareness actualities that function in our daily lives. Perhaps it is through such overt, concrete, specific action that we can come to a fuller understanding of what the whole person might become.

William J. J. Gordon (1961), the originator of the term "synectics," uses several different definitions for the term. One definition is the joining together of different and apparently irrelevant or unrelated items. He also defines "synectics" in terms of a problem-solving group, in which different types of people with diverse backgrounds are brought together to solve a particular problem. Finally, he uses the term as the title for his own theory of creativity.

Three Assumptions

Three assumptions underly the theory of synectics. First, "that the creative process in human beings can be concretely described and, further, that sound description should be usable in teaching methodology, to increase the creative output in both individuals and groups." The second assumption is "that the cultural phenomena of invention in the arts and in science are analogous and are characterized by the same fundamental psychic processes." Third, "the individual process in the creative enterprise enjoys a direct analogy in group process" (Gordon 1961, pp. 5-6).

Gordon has identified a number of what he terms "mechanisms," intellectual tools one can bring into consciousness when they are needed. The mechanisms are variants of the familiar tools of analogy and metaphor.

The Synectics Mechanisms

The synectics mechanisms Gordon talks about are Direct Analogy, Personal Analogy, and Compressed Conflict. A Direct Analogy might be the observation that a crab walks sideways like a sneaky burglar, or that a porch is to a house what a belly is to a fat man. As an example of a Personal Analogy, a teacher might say: "Harold, imagine that you are the mud in which the fiddler crab makes his home!" Harold: "I have the feeling that no one cares if I'm here or not. I'm full of holes into which the crab crawls at night. They never thank me. I'm mud. That's all. I'd like to do something to make the crabs thank me. After all, if it was not for me, the crabs wouldn't have any protection, and I try to move, but I can't and I see a crab about to be eaten by a striped bass. I want to flow out, and go around the crab and save him, but I can't." To be the crab, to "get inside" the crab, is to use Personal Analogy.

A Compressed Conflict is "a poetic, two-word description on a high level of generality where the two words don't seem to fit and sometimes actually contradict each other" (Gordon 1966, p. 25). For example: "imprisoned freedom."

Most of us have probably at one time or another read some poetry. One poem that is frequently used by English teachers is "Dover Beach," by Matthew Arnold. In the first segment of this poem, Arnold describes the sea and the sand, the beach at Dover. Then he astounds the reader by moving to "seemingly" unrelated images—to the shores of the Aegean sea that Sophocles might have observed, to the retreating roar of the Sea of Faith, to the Church, and then to Arnold and his love, who, like strangers on the world's beach, must be true to each other as the world swirls about them. The images and metaphors hang together, if only because we "see" the experiences as possible in our own reveries. "Dover Beach" is a creation in the mode of the synectics process.

Another use of the same type of analogy to conjure up a different image comes from modern music—Leonard Cohen's song, "Suzanne." There are three stanzas to the song. The first and last stanzas deal with Suzanne, a prostitute who "takes you down to her place by the river." Then, in the middle stanza of this song, Cohen juxtaposes an allusion to Jesus. Again, we're faced with seeming unrelatedness—a savior and a prostitute. I'll leave it for you to make the connections.

Some Synectics Activities

I think you may now have some feeling for making the strange familiar and making the familiar strange. Now, let's look at some activities that Synectics, Incorporated has published for use with elementary and secondary school students.*

Example

What Needs MORE PROTECTION?

A TURTLE A ROCK

Why? 1 Turtle - because rocks are not even alive.

2 Rock - because a turtle can regrow a break in its shell. If a rock is split, it can't mend itself.

The first time you read the question, an obvious response such as #1 may occur to you. However, once you go beyond the obvious, you will find other possibilities—such as #2.

Now try some on your own. Circle the answer that seems more interesting *to you,* then explain your choice.

Which WEIGHS MORE?

A BOULDER A HEAVY HEART

Explain your choice: ______________________________

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*All activities used in this paper are excerpted from course materials produced and published by Synectics Education Systems, 121 Brattle Street, Cambridge, Massachusetts 02138.

Which GROWS MORE?

A TREE SELF-CONFIDENCE

Why does your choice grow more? ______________________________

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What COLOR is HAPPINESS? ______________

Why do you say happiness is that color? ____________________________

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Let's look at what twelve of the conference participants did with this activity:

Haas: How about a boulder and a heavy heart, what did you have?

John Neal: I'd say a heavy heart weighs more; a boulder has weight, but it can be dropped. A heavy heart is a burden that one must always bear. The heavy heart is a burden that must be borne without relief. The boulder can be unloaded, given up!

Haas: How about which grows more, a tree or self-confidence?

Fran Pratt: I would say the tree because, except in unusual circumstances, the growth is automatic. But with self-confidence—it can stop and start!

Haas: Okay, what color is happiness?

Jane Mounts: My immediate reaction was yellow because of the sunshine. It has to do with the feeling that one has coming back to Colorado and its sunshine, compared to being in Indiana, where you don't get a lot of that.

This activity has a purpose: it's a kind of starter, an activity to get people to begin to make strange things familiar, or familiar things strange, to make combinations of things that they might never consider as combinations or as comparable items. It's an introduction to understanding analogy and metaphor.

Another activity has the purpose of providing practice in dealing with Compressed Conflict. Recall that a Compressed Conflict is a two-word description seemingly in contradiction, such as the two-word phrase "imprisoned freedom." Try one of the following:

DELICATE ARMOR describes

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because ____

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FROZEN HASTE describes what one thing?

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Why? ____

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A ____________________ is
an example of DISCIPLINED FREEDOM because

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An example of REPULSIVE ATTRACTION is

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because ____

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Haas: Did anyone do 'Delicate Armor'?

Michael Wertheimer: I don't know the anatomical term, but the bugs outside have armor which protects and yet it's thin and excellently structured.

Mounts: I did the same one. I was thinking about the armor of a beetle, which protects him, but which is delicate in the sense it does not protect him against the person walking. The armor may be more delicate because of the design—the pattern you may find, say in a Japanese beetle.

Mounts (continuing): I had a different thought on that! Self-confidence—it will allow you to go into new situations. Self-confidence is a delicate armor because it can be destroyed by other people's reaction to you. It's very sensitive to outward pressures.

Haas: Yes!

A participant: I did 'Frozen Haste': a melting ice cream cone in the sun becomes liquid faster and faster.

Haas: How about 'Disciplined Freedom'?

Cleo Cherryholmes: A basketball team, because the team has to be disciplined, but it allows lots of freedom for plays.

A participant: A free market economy! In order to survive, the firms have to be disciplined, yet are free to try lots of strategies.

Haas: Anyone else?

Wertheimer: A poem, a painting, or a sonata!

Jack Nelson: A human is an example of 'Disciplined Freedom' because we know discipline only from freedom, and freedom only from discipline.

Haas: How about a 'Repulsive Attraction'? Anyone do that?

Mounts: Kids are particularly fascinated with ugly beetles or bugs, or snakes. They are repulsed by them, and yet they are very attracted and fascinated by them at the same time.

The Use of Biology

Haas: Gordon comments that in working with individuals and groups, the most ''successful'' sources for analogies and metaphors are the phenomena of biology. Gordon describes in his book, *Synectics* (1961), a case to illustrate this point. A group was brought together to work on a Department of Defense problem, from the Armored Section of the Army. The problem was that in very rough terrain it's often difficult to get a division of tanks easily and efficiently through that terrain. They often get bogged down for one reason or another, and especially in areas where there are ravines, such as those 30 feet across, and maybe 30 feet deep. The tanks cannot negotiate that kind of terrain. Either the walls are too precipitous, or the bottom is too sandy, and the tanks just dig in or can't get up the other side.

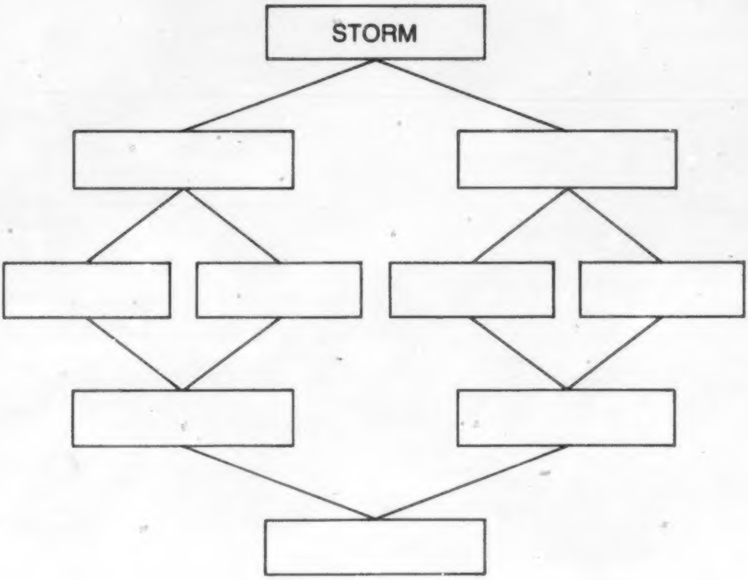
The group that was working on this particular problem came up with a number of ideas such as having a company of engineers accompany the armored group to put up portable sliding bridges where the steel sections slide out over each other and extend across the ravine. Of course, such a solution means that you have a relatively immobile group (engineers) with a relatively mobile group (armored).

Soon one person said, "You know, *ants* transport their food to ant hills in ways that might help the tanks. In fact, often the ants themselves will become bridges for other ants to carry food across. The ants' ravines are very minute to us, but relatively the same as a ravine for a tank." Then someone else said, "Yes, that's true, but we can't have tanks going over the other tanks." Another said, "Yes, but you know when the ants are finished with the bridge, one ant pulls the other ants across."

Finally, the group decided if they connected the front and back of each tank (a connection that would allow a flexible hookup and then a rigid connection) and make two tanks actually one tank, then make three tanks actually one tank, one tank could be suspended over the ravine, while two (or three or four) other tanks connected would counter-balance it. The first tank would be thrust out over the ravine and reach the other side and continue on, and then the tanks behind would follow suit until all were safely across. In this problem-solving situation, the ant analogy was most fruitful.

Analogy Boxes

The following exercise, called "Analogy Boxes," provides practice in creating Direct Analogies:



Given the word "Storm" in the upper box, one participant produced this chain: "On the left-hand side, Storm led me to Wind, which led me to Rustle and Nothing, and it looked to me like Rustle and Nothing seem to lead to Ghost. On the right-hand side, Storm, because I grew up in Denver, reminded me of "Tempest Storm" which led to the word Strip Tease, which led to the words Beauty and Despair, which then led to Conflict. Finally, Ghost and Conflict, settled into Imagination."

What can also be done with "Analogy Boxes" is to consider each box or pair of horizontal boxes as a line of poetry, thus using an expanded set of boxes to create a poem. One can obtain amazing poetry from students when you start with a feeling in the top box.

Personal Analogy

Now let's move a little closer to our home base, social studies. The activity involves the use of Personal Analogy. Try to be empathetic with the object. As I burn (using the flame of a cigarette lighter) this small plastic spoon, attempt to "be the spoon." Tell me about "you," the spoon!

Mounts: An attack! I'm being attacked by an outside force of fire. It has destroyed me and my purpose for being.

Neal: Being misused, being consumed. This is not the best use of my talents.

Mounts: I have no power to resist.

Haas: The heat has bent you out of shape, paralyzed you. They throw you back among other pieces of plastic, other spoons. You look different now because you are not the same shape as all the other spoons in the pile. How do you get along with your friends now that you have changed? Be the spoon!

Peter Senn: This is hard for me. I can't even imagine having empathy with a thing.

Wertheimer: A real stand out: very different.

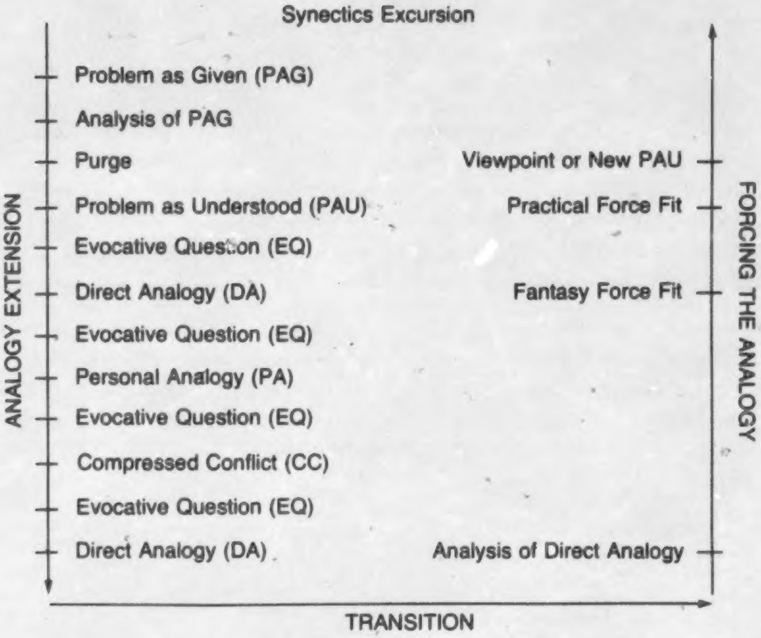
Raymond English: I'm not a spoon anymore.

Wertheimer: Even though I am twisted out of shape, at least I have become an individual. Before I was heated and bent. It was exactly like all the other spoons! If I wanted to stand out and be noticed, obviously it's better to be in this strange, unique plastic form. On the other hand, if I want to be like everybody else, I'm ruined.

This then is an activity to aid learners in developing the ability to use Personal Analogy, one of the synectic mechanisms.

Synectics Excursion

The synectics people have also developed a complete problem-solving system called a "Synectics Excursion." The left side of the figure (vertically) might be described as the divergent thinking phase. The bottom (horizontal) line is a transition phase, which occurs when the group feels a particular Direct Analogy has the most promise. From the transition phase one moves to the convergent thinking phase. The "excursion," then, has three phases: divergence, transition, and convergence.


Synectics Excursion
Problem as Given (PAG)
Analysis of PAG
Purge
Problem as Understood (PAU)
Evocative Question (EQ)
Direct Analogy (DA)
Evocative Question (EQ)
Personal Analogy (PA)
Evocative Question (EQ)
Compressed Conflict (CC)
Evocative Question (EQ)
Direct Analogy (DA)
ANALOGY EXTENSION
Viewpoint or New PAU
Practical Force Fit
Fantasy Force Fit
Analysis of Direct Analogy
FORCING THE ANALOGY
TRANSITION

Each phase contains a number of steps. In the divergent thinking phase the first step is the "Problem-as-Given (PAG)." The problem is given; the original statement of the problem is presented by the person whose problem it is. The second step is the analysis of the PAG. This should be concrete and tough-minded.

The third step in this phase of the excursion is purging ideas and criticisms. In other words, the group at this point comes up with some of the most common, close-in solutions to the particular problem as given. These need to be purged because obviously other people have thought of them and they are unworkable.

Fourth is the problem as now understood (PAU) by the group. It's a simple statement of the essence of the problem as given, not as understood by the person that presented that problem, but now as understood by the entire synectics group. This is the task group that must deal with the problem, and so they, as a group, must agree on how they construe the problem.

The next step is an EQ, an Evocative Question. The group leader (or someone else) poses an evocative question to move the group toward its first Direct Analogy (DA). The next sequence again begins with an EQ, but this time the EQ builds on the DA, leading to a Personal Analogy. This is followed by another EQ, based on the previous DA and PA, in order to produce one or more Compressed Conflicts (CC).

The final step in this phase is another sequence of EQ, DA, PA, and CC until a "fruitful" DA is found for further pursuit. At this point an intuitive, Quakerlike, sense-of-meeting decision is made and the group moves to the convergent side of the excursion.

The first step in the convergent phase is further analysis of the "promising" DA. The group may then pursue why the particular DA appealed to them. Next, the group moves to a Fantasy Force Fit (FFF). If it's a technologically practical force fit, someone says, "Let's try it out on a small scale." This is the Practical Force Fit (PFF). The group (or one of its members) builds one to see how it works. Now a viewpoint is reached on the PAU and the group can move to practical application, or a new problem as understood is accepted which takes the group back again to the beginning of another Excursion.

This, obviously, is an oversimplified view of a Synectics Excursion, the process or problem-solving sequence and the use of synectics mechanisms. The excursion does not seem to be as valuable as the mechanisms—Direct Analogy, Personal Analogy, and Compressed Conflict. Most social studies educators know at least four or five equally useful inquiry models. It is the development of the mechanisms or skills, of being able to conjure metaphors and analogies, that is the contribution of synectics.

A Closing Note

The model making process in human affairs is an extremely important one. It gives us "handles" on the world. If those handles, however, are *merely* social science or science concepts, which lack a base in folk experience or are named with obscure and esoteric terms, they remain as mere abstractions. Other metaphors are more useful because they are "packed" with common experience. Concepts, analogies, and metaphors which are created from personal, concrete experiences are more useful in the affairs of humanity. Synectics mechanisms can help us derive meanings from collective experience without appeal to specialized concepts. One participant provided an appropriate conclusion: "I understand you were saying something quite basic. We get bound up in science and social science, in adopting scientific models as though the humans can be fit into them. That leaves out the realms of common, human experience, of feelings, of art, and of literature."

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